The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York.

Vol. XX: No. 10. *New York, Thursday, September 6, 1877.* *$4.50 a Year, Including Postage. Single Copies, Ten Cents.*

Iron Making in the Straitsville District.

Mr. Edmund C. Pechin, well and favorably known to the ironmasters of the country, contributes to *The Metallurgical Review** for September the first of a series of articles of exceptional interest and value on "The New Iron District of Ohio," which is the fullest and most intelligent consideration of the claims of this district to recognition as a great future center of iron production which has yet been given to the public. Mr. Pechin is a gentleman of eminent qualifications for the task, and speaks from the results of careful personal examination of all parts of the field. The map, for which we are indebted to *The Metallurgical Review*, shows the topography of the country and the location of the several furnaces built or building. We condense the following from Mr. Pechin's paper, of which the part already given to the public relates mainly to the furnaces and ores. A consideration of the coals of the district is promised in the October issue of *The Metallurgical Review*:

A visitor can avail himself of either of two routes: From Zanesville or Newark to Shawnee by rail. Examine at that place the Fannie and XX furnaces (running) and the New York Furnace (building), and the benchings and drifts at Iron Point on the upper vein, and the drift at XX on the lower vein of ore. Take a conveyance and drive to New Straitsville, *via* Baird's Furnace (running) and diggings; the Thomas Furnace (running), at Gore, and the location of the Sandusky Furnace (building), near Oreville. From Straitsville, down the Snow Fork to the Ogden Furnace (building), below Murray City, and thence to Nelsonville, *via* the Akron Furnace (building), at Bessemer. Or, from Columbus to Straitsville by rail, thence *via* Gore, Baird's, Shawnee, down the Snow Fork, as above.

Two other furnaces now building, the Winona, north of Logan, and one at Moxahola, to the northwest of Shawnee, will require independent action, as well as a visit to Sunday Creek. The following section, obtained from observation and from a shaft sunk near Ewing, on Sunday Creek, and kindly furnished by Col. Abbott, of Shawnee, may be of service for reference. It must be remembered that the measures are dipping to the southwest at about 28 or 30 feet to the mile. The Big Coal, which is near the top of the hill at Baird's, is deep under the surface at Sunday Creek.

The unnoted intervals are sandstone or shales.

2 ft. 6 in. Cambridge limestone, highly ferruginous.
37 ft. 6 in.
2 ft. to 3 ft. Iron ore, 33 per cent.
1 ft. 6 in. to 4 ft. Splint coal.
1 ft. Fire clay.
11 ft.
2 ft. to 4 ft. 6 in. Shawnee ore.
14 ft.
2 ft. to 3 ft. Nodular ore, 35 per cent.
10 ft.
4 ft. 6 in. Bayley's Run Coal, No. 7 coking.
1 ft. Fire clay.
1 ft. Nodular ore, 35 per cent.
13 ft.
2 ft. to 3 ft. Dark limestone ore.
2 ft. 6 in. Light limestone.
59 ft.
12 ft. Big Coal seam, No. 6.

Borings 60 feet deeper at this point showed no ore under the coal.

It will be observed that the thickness of the various ore seams appears to be somewhat indefinite. Why this should be, with opportunities for close measurement, is rather surprising, but perhaps it is natural to give the ore the benefit of the doubt. It is not unusual for land owners to discover, in prospecting, larger veins or deposits of minerals than the miner can find in actual practice. The two veins of ore which at present are the sources of supply for the furnaces built and building, are:

1st. A seam about 30 feet below the Big Coal, known as the "Baird ore;" and

2d. A seam about 110 feet above, known as the "Shawnee ore."

A third seam, about 30 feet under the Baird ore, is now being mined at Webb's Summit, for the Gore Furnace, and the following analysis made by Dr. Wormley, was obtained from Col. Dennison, the superintendent of the furnace:

Sesquioxide of iron	61.02
Oxide of manganese	1.10
Silica	20.75
Alumina	8.80
Carbonate of lime	3.10
Carbonate of magnesia	1.14
Sulphur	.18
Phosphoric acid	1.31
Combined water	2.30
	99.73
Metallic iron	42.71

I very much question the propriety of attempting to work this ore at all, as the high percentage of silica and phosphorus would give a highly silicious and cold-short pig, which could not compete with the other irons of the district. The vein is represented to be from 18 inches to 2 feet, but we did not think it worth while to make a personal examination.

Some time ago there was widely circulated a report of a wonderful discovery of a vein of excellent ore, from 6 to 7 feet thick, a short distance from Straitsville. Naturally we were desirous of seeing such a wonderful find, and lost no time in visiting it.

On the shelving side of a hill about two feet of dirt had been stripped off of a space, say, 16x8 feet. No attempt whatever had been made to "raise" the ore, or to expose it vertically, except at one corner, where a hole about 18 inches had been dug, which had really exposed the shallowness of the whole thing, for we could see only a few inches of ore on top, while underneath were shales, clay and pieces of sandstone, with occasionally a skull or streak of ore. An hour's work or a single shot would have told the whole story; but this, evidently, would not have suited the purposes of the owner. The so-called vein was, to our minds, simply a slip, and when we asserted this, to our surprise the owner promptly assented, and said that the true vein was 15 feet higher up and was 4 feet thick. As there was no opening visible, we had no opportunity of judging or measuring for ourselves, so had to take it on a faith considerably shaken by what we had seen and measured. * * *

We will here venture the prediction that neither now, nor at any future time, will any seam of ore of 35 per cent. richness, that will average over 4 feet in thickness, be discovered in the coal measures, except in isolated patches of Blackband. The carbonates are uncertain, both as to quantity and quality, as we are convinced will be verified in many instances in this new district, and all of the ores we saw are carbonates, weathered on the outcrop into limonites.

The Winona, north of Logan, the Thomas, at Gore, Baird's, and any other furnace built in this locality, must mainly depend upon the Baird ore. The Shawnee ore, if found at all, will only be near the tops of the hills, and in limited areas. The Gore furnace, at the time of our visit, was working on an admixture of the Baird Block Flint and a Lake Superior magnetite, making from 20 to 22 tons a day of No. 2 mill iron. The furnace is 47 ft.x12 ft. 8 in., closed top and blowing 3½ pounds through 4 in. tuyeres. * * *

The cost of making iron was given as follows:

3 tons of coal at .75c.	$2.25
3 tons of ore at $2.25	6.75
1 ton of limestone at $1.25	1.25
Labor, repairs, &c.	4.00
	$14.25

The coal is brought by a tramway about a mile, and the ores and stone are partly hauled by wagon and partly by rail. The cost of No. 1 Lake ore delivered through the region is about $8.75 per ton, and necessarily the cost of the iron increases to the extent of the percentage used.

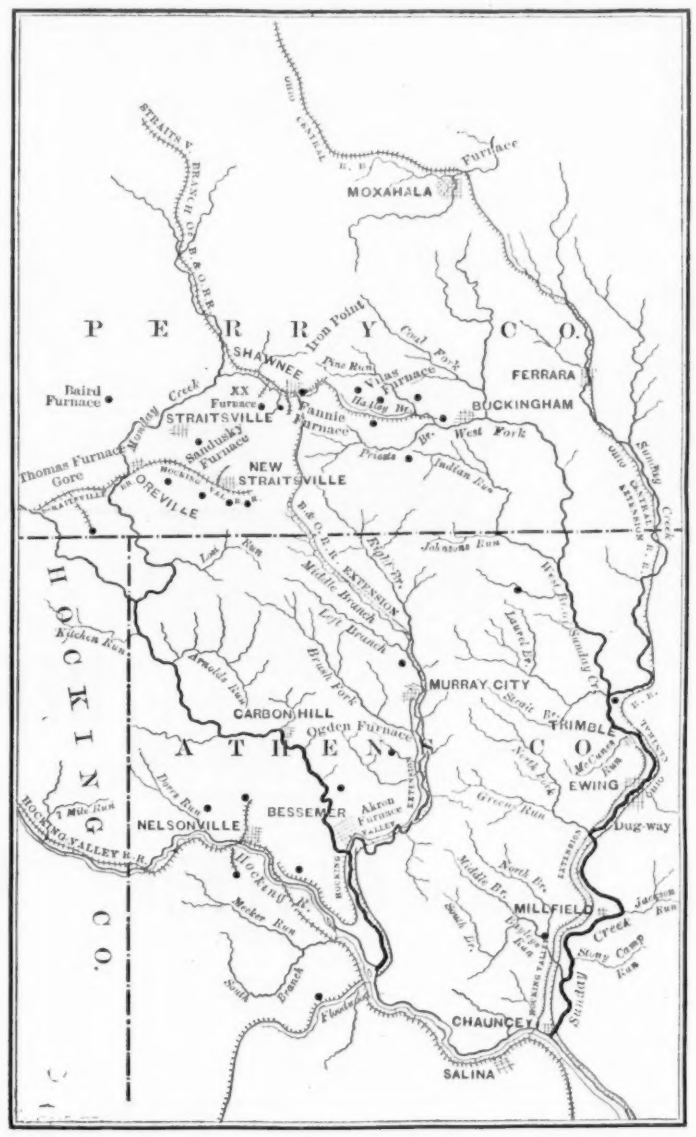
About two and one-half miles northeast of Gore, in Section 13, is the furnace of Mr. S. Baird, the pioneer of the region. Mr. Baird labors under the disadvantage of having to haul his iron to the railroad at Gore; but his coal, of excellent quality, is in the hill directly back of the furnace, and his ore within one-half to three-quarters of amile. * * * *

The ore at Baird's was much better than that seen at Gore—very much less silicious and more lime. It was a matter of regret that Mr. Baird could not furnish us with any analysis of his ore or iron. His furnace was the first erected, and is the smallest in the district, being 44 ft.x11 ft. 8 in. At the time of our visit Mr. Baird informed us that the daily product was from 16 to 18 tons. The iron was very strong, tough gray forge, and we were not a little surprised to see such an iron made from these ores alone; but an examination of the plant explained the apparent anomaly. The hot blast originally erected had given out, with the exception of a few pipes. The blast was only heated to about 250 degrees, and the coal being exceedingly pure, the product of the furnace was practically a warm blast charcoal pig. When the new hot blast, which was nearly finished, goes on, and the heats are raised to 750 deg. or 800 deg., less coal will be consumed and more iron made; but unquestionably the iron will contain much more silicon and phosphorus. The mills using this warm-blast iron give it a very high character, and it becomes a nice question whether in working this particular ore there may not be a larger profit and better market by running on this grade of iron than by attempting to make hot-blast iron. With a properly constructed furnace a daily product of thirty tons of warm-blast iron could be had, and the cost of the plant would be comparatively small. I asked Mr. Baird the plump question, "What does your iron cost you?" and he replied without hesitation: "On paper I figure out $13, but when I get it on the cars it really stands me nearer $15 than $13." * * *

The most interesting point in the whole region is Shawnee, not only by reason of the magnitude of operations, but because positive light is being throw upon the condition and character of the ore deposits. The large mining operations are at Iron Point, about one and one-half mile from the town, where the ore is found lying about 110 feet above the Big Coal.

From what I have seen I feel convinced that the future industries of the region must mainly depend upon this ore seam, and this view is confirmed by the opinion of Mr. I. B. Riley, C. E., who has spent many years in this section, and given much attention to its mineral resources.

At Iron Point, in addition to extensive benchings, two headings have been driven into the hill from 100 to 300 feet. Careful measurements on the face of the ore on the



MAP OF THE STRAITSVILLE AND HOCKING VALLEY COAL AND IRON FIELDS.

tion at his hands. He labors under the disadvantage of having a badly shaped furnace. The top is drawn in entirely too much, the bell is ridiculously small for such a furnace, and the arrangement of the tuyeres is objectionable. A second furnace is building alongside, in which a number of the defects of the first will be corrected, and which will give very much better results. A very moderate outly in relining the present furnace and giving her a proper-sized top would double her present production, and, of course, decrease the cost per ton. * * *

The cost, as given me, was as follows:

Coal, 3 tons, at $0.75	$2.25
Ore, 3 " " 2.00	6.00
Limestone, 3/4 ton, at 80c	.60
Labor, repairs, &c	4.00
	$12.85

As, however, 15 per cent. of lake ore was being used, the higher price of this would probably bring the cost to, say, $14.50. Both coal and limestone are close to the furnace, but I was told the company bought all of their materials. The limestone is about fifty feet above the coal, and is from two to two and one-half feet thick. Mr. Duval told me that they had contracted for a year's supply for both furnaces at 80c., delivered. This is certainly a low figure for the work to be done, and I think it doubtful if future supplies can be had at this figure.

The XX is the largest furnace in the district, being 50 ft.x13 ft. 6 in., blowing through eight 3 in. tuyeres, and making from 20 to 22 tons of foundry iron. This is under the charge of Mr. Fleming, whom I had known at the Port Washington furnaces, and gave evidence of good management. Mr. Davis, the president of the company, was very kind in showing us around. He is thoroughly testing the Baird or lower ore at this point by driving on it through the hill. Other workings had been opened near by with unsatisfactory results, the ore changing into sand rock or running out. At X X the drift was not far enough in to give definite results, but I did not fancy the appearance of the ore. It looked to me as if it were steadily growing more silicious, and in its physical structure approaching a sandstone.

On Sunday Creek borings were made below the Big Coal, but no ore was reported. The results thus far seem to warrant the belief that this particular ore is not reliable, and is only to be found in good condition in certain localities and under light cover, and even when found will vary greatly in character.

Along Meeker's Run, below Nelsonville, where the measures below the Big Coal are very fully exposed, there are 20 feet of blue slates, filled with nodules and thin plates of a very fine carbonate, giving in the aggregate some 4 feet of ore. At the base of the slates, and resting on fine clay, is a plate some 9 inches in thickness. It is possible that some 20 inches might be wrought in the lower 6 feet, in which case the deposit wouldbe of great value. * * *

Properly calcined this would give over 50 per cent. I noticed this ore constantly as we traveled southward, and in several cases in the beds of runs it appeared as solid plates. I did not observe these measures at Shawnee, and it may be possible that they have changed their character at that point.

I have before me an official statement of the cost of one week's work at the XX:

	Per ton.
Native ore is charged at	$2.50
Lake " "	8.75
Coal "	.80
Limestone "	.90
Labor "	2.26
Incidentals "	.50
Making a total cost of	11.96

A single week's work is not, however, a fair criterion, and from what I saw I am inclined to think that the yearly average of labor and incidentals would be higher. One connected with the company told me that $14 would fairly represent the cost. The iron was uniform and handsome in appearance.

Continuing our journey, about two miles below Straitsville, on Snow Fork, Section 18, we found men staking out the ground for the new furnace of the Sandusky Iron Co. Much to our surprise, we were told, on our return to Columbus, that two days after we were there the location had been abandoned, and a new point between Gore and Straitsville selected. This furnace is to be 50 ft. x 15 ft., built on approved plans, with Whitwell stoves, and will undoubtedly prove a success. Witherow, Shepard & Lamond, of Pittsburgh, have taken the contract for the entire construction.

A short distance below Murray City, in a beautiful valley, the Ogden Iron Co., of Chicago, is building a furnace under the superintendence of Major Pickands, of Lake Superior, and lately the successful manager of the Bay Furnace.

It will be 50 ft.x15 ft., with Whitwell stoves and modern appliances generally. Lambert & Gordon, of Ironton, have the ironwork. Both at this point and at Bessemer, two miles below, where the Akron Iron Co. are locating their furnace, the natural advantages are exceptional. Coal, limestone and ore are found in the hills back of the furnaces, and all within a distance of a few hundred yards. Benchings have been made at various points on the Shawnee ore, and everywhere it looks extremely well.

* * * * * *

The Akron Furnace, which is to be removed, is 58 ft.x14 ft. If the owners will retain this height, and make the bosh 16 ft., they will never regret the change. These furnaces have the advantage of a good-sized stream to draw upon for their water supplies.

As the question of the persistency of this ore seam is really the important one, two days more were spent in examining the lands along the Hocking River, south of Nelsonville. On the property of Mr. Brooks, opposite Nelsonville, a little stripping had been done on a hillside, about 100 feet above the coal. The indications were favorable, but sufficient work had not been done to draw a safe conclusion. I advised Mr. Comstock, the manager, to drive in a "gouge hole" some 50 or 60 feet, as the surest way of ascertaining whether the ore existed in a workable condition. In company with Mr. G. W. Gill I made a careful examination of a large tract of some 1700 acres belonging to his father, Mr. I. L. Gill, of Columbus, lying on Meeker's Run and the Hocking River. Both the upper and lower coals had been opened in places and looked extremely well. The limestone was plainly observable above the coal, and at the proper elevation skulls of ore, similar in appearance to those at Shawnee, were plainly to be seen along the hillsides. Impressed with the importance of making proper examinations, Mr. Gill managed to have men employed to put down test holes, and since advises me that the developments have been of the most satisfactory character. The limestone has been uncovered, showing three feet, with the upper layer highly ferruginous; at about 90 feet above the big vein of coal, an outcrop of ore showing from 3 to 4 feet (corresponding to location of Shawnee vein), and about one hundred feet higher up another vein of ore about thirty inches (corresponding to the upper vein at Bessemer). I am also advised that both at Nelsonville and Haydenville excellent outcroppings have been uncovered. Hearing that in a shaft sunk at Salina, to reach the Big Coal, ore had been encountered, we went down, hoping to have an opportunity of inspecting it, but found that the upper part of the shaft had been planked up, and as the work had been done before the ore excitement, no one at the works could tell us anything about it. In searching among the debris dumped outside of the shaft, we found many small pieces of ore, resembling in appearance the Shawnee ore.

The most remarkable "shows" of ore are to be found along Sunday Creek, especially on Lower Sunday, where the coal is some 80 to 100 feet under the surface. At a number of places, notably at Dug-way, were very bold showings of ore, some 3 to 4 feet thick, the horizon corresponding to that of the Shawnee seam. A vertical section of some 7 to 8 feet was uncovered and claimed as ore, but analysis will certainly develop the fact that the lower plates are entirely too silicious for use. In the hills along both sides of Sunday Creek, and especially around Millfield, one can see some five distinct ore horizons above the Shawnee horizon, the seams running from 10 to 30 inches, and all of them excellent looking ores. Of course one can only judge by the external appearance, as no reliable analysis could be had. Up Jackson's Run, on the tops of the highest hills, are left patches of the Pittsburgh coal seam, worthless in itself, but carrying above and below it the heavy ledges of excellent limestone, identical in character with that used in Southwestern Pennsylvania. The fact of the existence of this stone, so good in quality, so easily reached and cheaply quarried, is of very great importance in this locality, where the other seams of stone are so small. Without intending to detract from the very great advantages in the northern portion of the field, the careful visitor can hardly fail to be impressed with the idea that nature has done most for the Sunday Creek region, and that a great future awaits it when properly opened.

To sum up, the ore found at Shawnee has been opened in equally good condition at Ogden and Bessemer respectively, nine and eleven miles south and three east, and at intermediate points; at Ewing, six miles east

[*Continued on page 5.*]

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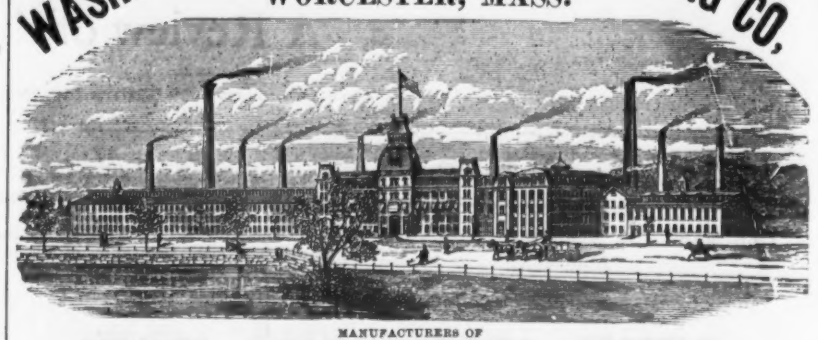

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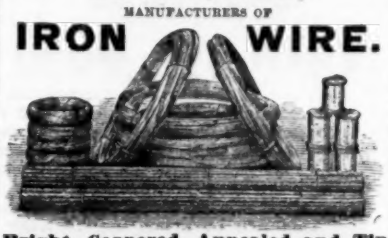

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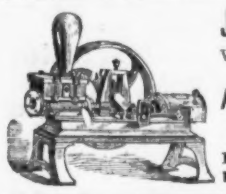

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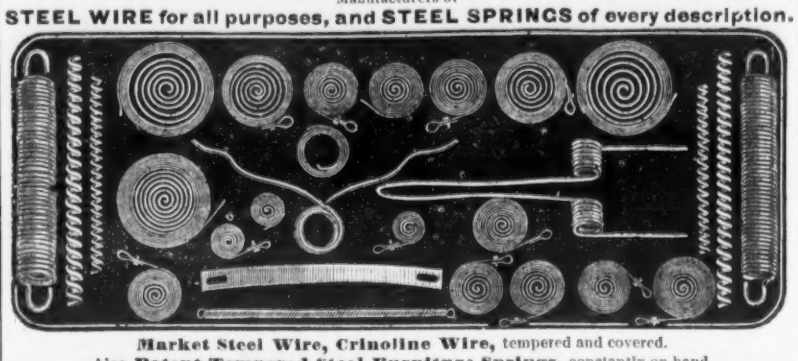

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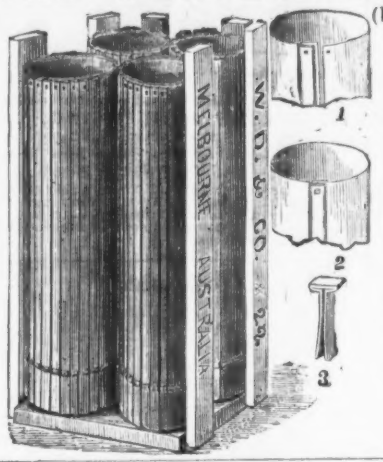

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Iron Sponge as a Filtering Medium.

In April of the present year Mr. Gustav Bischof read a paper before the Royal Society of England upon the action of spongy iron in purifying drinking water from the putrescent organic matters which render it so dangerous. The tests used to ascertain whether the water experimented upon was safe and free from pollution are very delicate, and the experiments made are of the greatest value. We therefore give his paper at some length:

It is indeed fortunate that the smell and taste are generally extremely sensitive indicators of putrefaction in articles of food. This does not, however, apply to drinking water, which may be largely polluted by putrescent organic impurities without causing any suspicion to our senses. And yet the question of the wholesomeness of water hinges mainly upon the presence or absence of such putrescent matters, as they themselves are the cause of derangements of the human system. Most serious, however, are the consequences when those low forms of organic life, which in all probability form the specific poison of cholera, typhoid fever and other diseases, gain admission to drinking water polluted by putrescent matter.

A number of observations point to the conclusion that these organisms, or germs, are not infectious as long as surrounded by fresh organic matter; but as soon as fermentation sets in they show their poisonous virulence. Thus it has been observed that the discharges of cholera and typhoid patients are not infectious so long as they are fresh, but by putrescence their poisonous character is developed.

Chemical analysis is incapable of discriminating between living or dead, fresh or putrescent organic matters. The microscope reveals their nature more fully; but it is nevertheless frequently a matter of great difficulty to decide as to the existence or non-existence of *bacteria* of putrefaction, or their germs, in water. It thus appeared to me that this information might, in some cases at least, be gained with great certainty by an indirect method.

If we want to determine whether a gas be carbonic anhydride we pass it through potash bulbs, and see whether these increase in weight. Similarly the presence or absence of putrefactive agencies in water may be determined by their action upon organic matter. The test I selected is fresh meat, as the slightest putrescent changes in it can most readily be detected by its smell.

The experiments, which were originally made with a view of determining the improvement of water by certain filtering media were, with the exception of experiment VIII., carried out in the following manner:

On to the perforated bottom *a*, of a stone ware vessel *s s*, I place some fresh meat. The vessel is then filled to about two-thirds with the materials to be experimented upon, and lastly, with water. Into opening *c* a tin tube is fixed, which is first bent upward and then downward in the shape of an inverted U, to prevent any *bacteria* or their germs from passing through this outlet tube into the bottom of the vessel. The air-pipe *d*, down to *c*, is filled with firmly compressed cotton wool, and a glass tube, sealed at its bottom, passed down through the material experimented upon, to allow of the temperature being measured in close proximity to the meat. The vessels thus prepared are immersed in a boiler filled with cold water, which is gradually heated and kept boiling for several hours. The object of this is to destroy any germs adhering to the meat. The temperature at the bottom of the sealed glass tube was, during the boiling, in each of the following experiments 93–95° C.

After cooling, the Chelsea Company's water was constantly passed through the vessels in the direction indicated by arrows, at as nearly as possible a uniform speed.

It is thus evident that any *bacteria* of putrefaction, or their germs, in the water would, after a time, render the meat putrid, or if it remains fresh they must have been absent or at least inactive when the water reached the meat.

I now proceed to describe the experiments:

Experiment I.—One of the vessels was filled with spongy (metallic) iron, and treated as before described; after a fortnight the meat was perfectly fresh.

Experiment II.—A vessel filled with animal charcoal; after a fortnight the meat showed strong evidence of incipient putrefaction. As experiments I. and II. were conducted side by side, this result proves that the preservation of the meat in experiment I. was not due to any external cause, such as the low temperature then prevailing.

Experiment III.—Water continuously passed through a vessel filled with spongy iron for four weeks; even then the meat was perfectly fresh and hard.

Experiment IV. was a repetition of II., the filtration of water through animal charcoal being continued for four weeks. The meat was soft and quite putrid. In the course of this experiment the exit tube was several times choked by mucous matter.

Experiment V.—In experiments I. and III. with spongy iron, this material was employed without separating any of the fine dust. In order to ascertain whether *bacteria* were merely mechanically retained, a vessel was charged with spongy iron, from which all the finer particles had been separated by a sieve with 30 holes on the linear inch. The filtering medium in this case was therefore of a porous nature. After four weeks' filtration the meat was perfectly fresh.

Experiment VI.—In the previous experiments with spongy iron the meat was in contact with water from which the iron in solution had not been separated. With a view of ascertaining whether the iron in solution was the preserving agent a stoneware vessel was charged underneath the spongy iron with pyrolusite and sand, so as to abstract the iron from the water before it came in contact with the meat. After four weeks' filtration the latter was found perfectly fresh.

Experiment VII.—By a separate experiment I ascertained that the oxygen is completely abstracted from water during its passage through spongy iron. In order to determine whether the absence of oxygen be the cause of the preservation of the meat, and whether the *bacteria* or their germs be killed or can be revived when supplied with oxygen, an evaporating basin was inverted over the meat. This must have retained a quantity of air in its cavity, the air being gradually dissolved by the water in close

proximity to the meat. After four weeks' filtration the meat was perfectly fresh. I succeeded in collecting a small bubble of the gas, still in the cavity of the evaporating basin. This was quite free from oxygen. It is therefore doubtful whether oxygen was supplied to the water sufficiently long to justify any conclusions from this experiment. However, the result of experiment VIII. rendered a repetition unnecessary.

Experiment VIII.—Fresh meat was placed at the bottom of a glass vessel and left standing, covered with about 4 inches of spongy iron and water. The vessel in this instance was not boiled. After three weeks the meat was very bad, demonstrating that the action of the *bacteria* of putrefaction adhering to the meat was not prevented by the spongy iron above, and if, during the previous experiments with spongy iron, agencies capable of causing putrefaction had at any time come in contact with the meat—in other words, if the *bacteria* had not been killed in their passage through spongy iron—the meat must, as in this last experiment, have shown marks of their action. It therefore appears that *bacteria* are permanently rendered harmless when passing in water through spongy iron. This conclusion is further corroborated by the observation that even effluent sewage water, after passing through the spongy material, has remained perfectly bright for now five years, when exposed to light in a half-filled stoppered bottle.

I believe that the action of spongy iron on organic matter largely consists in a reduction of ferric hydrate by organic impurities in water. We know that even such organic matter as straw or branches is capable of reducing ferric to ferrous hydrate. We know that even such indestructible organic matter as linen and cotton fibers is gradually destroyed by rust stains. This action is slow when experimenting upon ordinary ferric hydrate, but it may, *in statu nascenti*, be very energetic—the more so, if we consider the nature of the organic matter in water. Ferric hydrate is always formed in the upper part of a layer of spongy iron, when water is passed through that material. The ferrous hydrate resulting from the reduction by organic matter may be reoxidised by oxygen dissolved in the water, and thus the two reactions repeat themselves. This would explain why the action of the spongy iron continues so long.

It is, however, quite certain that there is also a reducing action taking place when ordinary water is passed through spongy iron. This is clearly indicated by the reduction of nitrates.

Our knowledge of those low organisms which are believed to be the cause of certain epidemics is as yet too limited to allow of direct experiments upon them. It is not improbable that, like the *bacteria* of putrefaction, they are rendered harmless when water containing them passes through spongy iron; but until we possess the means of isolating these organisms, this question can only be definitely settled by practical experience. Should this not be satisfactory, should those specific contagia not be destroyed when passing in water through spongy iron, then the separation of *bacteria* by spongy iron may afford means of isolating those germs of disease; should it be favorable, then we shall have found in spongy iron the material to prevent the spreading of epidemics by potable water.

Breaking the News Gently.

A miner, named Hughes, fell down a winze in one of the Comstock mines several years ago, and was killed. His companions picked up his remains, and, putting them in an express wagon, started for his home. Another miner, a fine, good-hearted fellow, was sent on ahead to bear the sad news to the bereaved family. All the way along he was discussing with himself as to how he should tell the terrible story so as not to crush the unfortunate household; but he reached the house before having settled definitely upon his plan. Meeting Mrs. Hughes at the door he accosted her in the usual manner of an acquaintance, and then said:

"Where's George, to-day, Mrs. Hughes?"

"He's at work in the mine as usual, thank you, sir," said the woman.

"How's he feeling to-day?" was the next question. The newsbearer was becoming desperate. He was a brave man who would not have feared a caving drift or a delayed blast, whose heart was so tender that he did not know how to tell a woman of her husband's death.

With some show of surprise Mrs. Hughes answered the last question. "About as well as he generally does, I believe."

The man was desperate, and not knowing what to say, he blurted out: "I'll bet $10 he's dead, and here comes the body in a wagon."

He swallowed a big lump in his throat, and wiped his left eye with his shirt sleeve. Afterward, in talking over the matter to his comrades, he said it was the greatest trial he had ever experienced, and that hereafter when a man was killed they might call on somebody else to tell the news.

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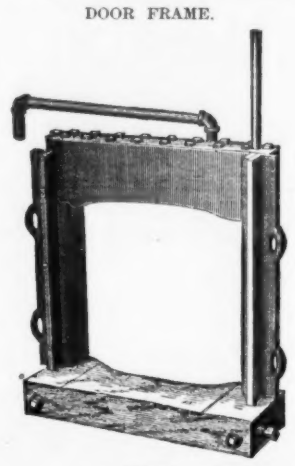
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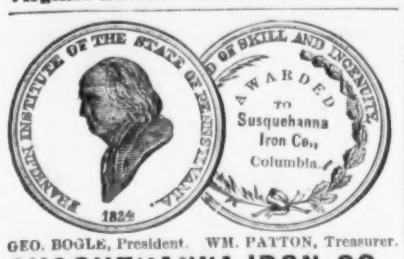

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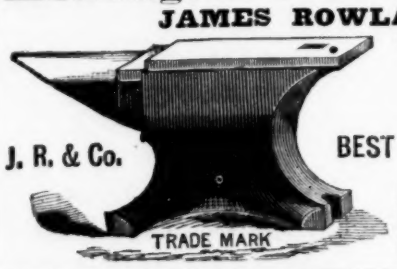

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[*Continued from page* 1.]

Iron Making in the Straitsville District.

of Bessemer; very strong internal evidences at Nelsonville, Meeker's Run and Salina, still further south; and again found in places at Moxahola, five miles north and three miles east of Shawnee. The measures everywhere run with wonderful uniformity, and the only disturbance is that occasioned by erosion. One is irresistibly forced to the conclusion that this particular vein of ore at least runs continuously with the Big Coal, and wherever the hills are high enough, or the coal low enough, it will be found in a workable condition. To settle this point finally, and to determine the quality of the ore under cover, a series of diamond dull holes should be put down at proper intervals. The expenses of such a work should be met by a fund raised by the land owners, operators and railroad companies running into the district. In truth, the latter are more interested than any single operator; for if the correctness of the above conclusion should be demonstrated, the question of an ore supply is settled for generations, without any other veins being discovered and utilized, and the region will rapidly advance to one of the greatest iron-producing centers of the continent. Not only will the production of pig iron be enormously stimulated, but the cheapness of the raw material, the admitted excellence of the fuel, the central position and the abundant transportation facilities will attract to the Hocking Valley and vicinity all those industries that are directly or indirectly connected with the use of iron and steel. Going there as a disinterested observer and, frankly confessing, somewhat of a skeptic, I am compelled to admit that, in the main, the natural advantages of the country have not been exaggerated.

There are many locations yet unoccupied where very large quantities of ore can be had by stripping at low figures, but by a proper system of long wall mining a 24 to 30 inch vein can be mined for $1.25 per ton, and 75c. per ton will cover mining dead work and a short transportation. The present price for mining coal is 40c. a ton, and I allow 35c. for other expenses. I place the cost of limestone at $1.20 per ton, which is largely in excess of present cost. I base these figures not only upon what I found, but upon my own experience of years in working under similar conditions.

In a proper location, therefore, with a thoroughly good plant, of not less than 35 tons daily capacity, and, of course, with the ownership of lands, avoiding royalty, and at present prices, a full grade foundry iron can undoubtedly be made for the following:

3 tons of ore at $2	$6.00
3 " coal at 75c	2.25
¼ " limestone at $1.20	.90
Labor	2.50
Incidentals	1.00
	$12.65

I feel quite sure that a properly constructed furnace would burn not more than two tons of coal to a ton of pig, and that the labor cost need not be over $2 per ton, but I prefer to be on the safe side. The admixture of lake ore would of course somewhat increase the cost. * * * * *

Ancient Signals and Expresses.

The great desire of the present age seems to be for speed. The world clings most fondly to the proverb that "time is money;" and, considering how much varied experience can be compressed into a few years by the greater rapidity of movement that the costly undertakings which we see around us place at our commmand, we might almost reverse the proposition, however illogically, and say that "money is time!" Distance, nowadays, counts for nothing. A train only goes 25 miles in an hour, and we call it slow; a racing boat is propelled by its crew upward of four miles in 25 minutes, and the "time" is pronounced to be "bad;" or, again, a man complains that he he has been "almost a whole month" coming from India—a matter of some 7000 miles.

But the most telling phase of this quickness of communication is, of course, the immense development of our telegraphic system. The successful laying of the Atlantic cable was the signal for schemes of ocean telegraph lines everywhere. Already there are three lines at work between Europe and America; and the Exchange and the Bourse on one side, and Wall street on the other, are not satisfied save with the news of the last few hours from the opposite continent. Not long ago the newspapers were full of grumbling at the tardy arrival of news from Bombay or Kurrachee, when a few hours (save the mark!) might have sufficed, and now we have contrived to beat the sun.

But if our almost universal "express messenger" at the present time is the telegraph wire—a quite recent innovation—it may be a matter of interest to inquire how men of old fared in this matter—not our own forefathers, but those who lived and struggled and thought and toiled in those bright classic days which possess for us so mighty a charm, holding up the mirror to us, that we may behold our own lives "writ small," so to say. We have but a few scanty notices on this point of ancient telegraphs and signals; but, by comparing them together, and illustrating, it may be, from more modern fashions among primitive races, a clearer idea will, perhaps, be gained.

Fire would naturally suggest itself as the earliest and most ready mode of signaling, as the eye is so easily attracted by light. This, of course, would be most effectual during the night, though a thick smoke would show on a clear day at a considerable distance. Accordingly, as far back as old Homer, we find Simon represented as signaling to the Greek fleet to return from Tenedos, now that the strategem of the "wooden horse" was successful, by lighting fires on the shore. Eschylus, in his "Agamemnon," describes, by the mouth of Clytemnestra, how the long looked for capture of Troy was made known at Mycenæ. From point to point the glare of the beacon flame spreads its news; from Ida to Lemnos, Athos, Macistus, Messapium; from the dun heights of Cithæron to Ægiplanctus, which passes on its tale of victory across the Saronic Gulf to Arachnæus, a hill in the hero's home territory; and the weary sentries of Mycenæ hail with joy the downfall of their foe, and wait their liege lord's speedy return. This passage will recall to the memory the famous parallel, if not imitation, by Macaulay, in his "Lay of the Spanish Armada," where the bale fires rouse England, from Plymouth to Carlisle, for defense against the foe.

Later on, in more historical times than those of Troy, Mardonius, the Persian commander left in Greece by Xerxes, is represented as prepared to telegraph the capture of Athens to his master at Sardis by similar means. But at the time of the Persian war fire signals had been brought to a considerable degree of accuracy. Herodotus tells us that as the Greek fleet lay at Artemisium, waiting for the Persians, it became known to them by fire signals that their three look-out ships had been captured by the enemy, though whether they learned in the same way that the crews had made their escape is not quite clear from the passage.

The daring menace of Brasidas, in the early part of the Peloponnesian war, on the harbor of Piræus, was telegraphed to Athens by fire signals. There was, however, on this occasion much confusion as to whether Piræus or the island of Salamis was the point threatened. This may either have arisen from the defective state of the art of signaling, or, not improbably, insufficient preparations had been made for conveying the news of so utterly unexpected a piece of audacity on the part of the cautious Spartans. At any rate, it is but very little while after this that, as we are told by Thucydides, signals were made by night to the Peloponnesian ships crusing near Corcyra of the approach of certain ships; that they were Athenian, and therefore hostile; that they were sixty in number, and that they were coming from the direction of Leucadia. The use of the verb, too, in the passage indicates that the art was much practiced.

This elaborate use of fire signals at sea was fully equaled by the information that could be thus conveyed in land operations. The well-known description of the escape of the Platæan garrison is a proof of this. It would appear that the daring party who made the sally owed their safety in some measure to the advance which had been made in the art of fire signaling; for the besiegers, finding that their enemies had passed the wall of circumvallation, signaled to Thebes an attack; but the Platæans left in the town had foreseen this, and had prepared a number of counter signals to create confusion and render the Peloponnesian signals indistinct, so as to favor the escape of their comrades. Now if the mere showing of lights had been a signal of danger, the raising of other signals from the town would have put the Thebans still more on the alert. The instance mentioned above of the Anthenian ships shows that direction could be indicated with no little accuracy, perhaps by waving lights steadily toward the points to be guarded. We may, therefore, suppose that the Platæans in the town waved in the contrary direction; and if they likewise gave a different account of the number of foes to be expected, it is easy to see that the possibility of a large force from Athens having suddenly appeared to raise the siege, or even to attack Thebes itself, would completely paralyze the movements of the Bœotians and make them unwilling to divide their force, or to quit the city till such time as the Platæans should have reached "dun Cithæron's ridge."

These are some of the most striking instances of the use of fire signals among the ancients. Perhaps we may venture to add to them a notice which Cicero gives of the approach of freebooters being marked by raising a fire on some conspicuous place: "*Prædonum adventum significabat ignis e specula sublatus aut tumulo.*"

Fire signals were thus, as we see, used considerably at night; but how information was as rapidly and accurately sent by day is not very clear. There are, however, one or two somewhat notable instances. Herodotus tells us that, after the failure of the Persians at Marathon, a party in Athens, suspected to be the Alomæonids, who wished for the restoration of Hippias, held up a bright shield as a signal to the Persians that they should sail around Cape Sunium and make a sudden attack on the city while the army was still absent. Where this shield was held up we are not told. Probably it was on some high point of Mount Pentelicus, between Athens and the Bay of Marathon. At any rate, from the description it seems to have been near the city; and it may appear strange that so slight a mark should have been observed at a distance of, perhaps, eight or ten miles. But every one must have noticed how often windows will "glimmer red" in the setting sun from a long way off, looking almost like a house in flames; and a brightly burnished shield would, in like manner, reflect the rays of the sun to a great distance. We may also take into account the clearness of the atmosphere of Attica.

> And to thy sons Olympian Jove hath given
> A brighter ether and a purer heaven.

Moreover, it is not impossible that the ancients may have trained men who were gifted with long sight to look out for such tokens as Macaulay indicates in his "Lay of Lake Regillus":

> Caius, of all the Romans,
> Thou hast the keenest sight:
> Say, what through yonder cloud of dust
> Comes from the Latian right?

It is wonderful how the faculties can be quickened in this way by practice. We hear of the Indians and the backwoodsmen detecting objects at a distance impossible to the unpracticed eye. De Quincey speaks of the marvelous sagacity of the Cumberland hillsmen in finding their way in spite of the blinding mists and snow storms. And, again, we who have ready access to books are struck with the retentive memory displayed by the rhapsodists of Greece, among whom to recite the whole of the "Iliad" was no uncommon feat.

The shield was apparently well known as the signal for attack. The admiral's ship in a fleet showed a shield at the stern as a signal for battle. Among the Romans, however (as we gather from Plutarch's description of the battle of Cannæ), a red flag flying over the consul's tent served this purpose. It is by no means unlikely that the ancients made far more use of the human voice than we are in the habit of doing. The soft air of the south of Europe disposes the inhabitants to much more frequent and powerful use of the lungs in speaking than is usual in the cold and bleak North. Greek statesmen were in the habit of addressing large crowds out of doors, in the *Agora* or the theater; and the profession of a herald required the continual practice of a naturally clear and commanding voice. Thus nature seemed to combine with art for the purpose; and it is a curious fact that in Albania, at the present day, the natives are wont to pass messages from hill to hill of their rocky and echoing country by a peculiar intonation of the voice; so that places many miles distant are thus brought within a few minutes' communication of each other. This phenomenon of mountain districts has been remarked by Sir Walter Scott in "Anne of Gierstein": "The voice again called to him with the singular, shrill modulation of the mountain halloo, by which the natives of the Alps can hold conference with each other from one mountain ridge to another, across ravines of great depth and width." With this may be compared the giving of the law from Mount Sinai, the blessings and cursings from Ebal and Gerizim, Jotham's parable from the ridge of the hill, Abimelech's partisans.

Another well-known means of sending news rapidly, in a country with such bad roads as Greece, was by trained runners. Thus we are told that Phidippides, a professional courier, ran from Athens to Sparta to beg for aid, just before Marathon, arriving at the latter city at the end of the second day; and this was a distance of one hundred and fifty miles. The constant gymnastic training in which Greek, and especially Spartan, soldiers kept themselves, enabled whole armies to make very rapid forced marches. In the present instance, the Spartan army, though slow to start, yet, when it did march, performed the distance in three days. So, the old Chasseurs de Vincennes, the picked light troops of the French army, were trained to make swift marches by running one on either side of a cavalry soldier, whose stirrup leathers they caught hold of. This, we believe, or something like it, is still kept up among the Zouaves. The episode of the fiery cross in the "Lady of the Lake" shows how quickly a district may be aroused by a well-organized system of running messengers. Indeed, the swiftness of rumor is as proverbial as its exaggeration. Lady Duff Gordon, in her voyage up the Nile, found that the news of her approach invariably outstripped her movements, rapid as they were. The curious story, given by Herodotus, of a herald's staff found floating on the sea at Mycale, and of the rumor that straightway ran through the Greek host of a battle won by their countrymen in Greece Proper, that very day (at Platæ) is also a case in point. In countries more favorable for speedy traveling, much use was made of horses and other animals. The admirable system of roads and posts instituted by the kings of Persia throughout their vast dominions; "the posts that rode upon mules and camels," as we have it in the "Book of Esther," excited the wonder of Herodotus, who says emphatically that "there is nothing in the world swifter than the messengers!" At the present time Arabs will not unfrequently travel a hundred miles in a day on their untiring horses.

The Romans with their straight roads, the primary object of which, as of Russian railways, was speed for military purposes, provided, we may be sure, the means for making the utmost of them. In the times of the empire, post houses were set up along the great highways, every five or six miles, with about forty horses at each; so that a Roman ambassador, for instance, using these relays, might easily journey in his chariot a hundred miles a day.

Occasionally ships were sent as express messengers; the Salaminion and the Paralus were used for this service at Athens. We do not know what rate of speed was reckoned upon. Herodotus calculates that a vessel would accomplish from six to seven miles an hour by daylight; but as he also assumes a certain amount of progress by night, he is probably speaking of a merchantman; for the crews of triremes often stopped at night and went ashore. The famous chase, mentioned by Thucydides, after the trireme conveying orders for the destruction of the Mytilenæans, was noticed as an exception, the crew of the pursuing vessels sleeping by turns. As the first trireme had twenty-four hours start for the distance between Athens and Lesbos, we can hardly put the pace of the other as less than 10 miles an hour; so that the speed of a well equipped Athenian trireme may have approached that of a modern steamship. Carrier pigeons were not used, that we know of. To make the famous pigeons of Dodona carriers would be pushing the rationalism of legend to an extreme point.

The I. X. L. Alarm Till and Lock.—In our notice last week of Mr. Rosenfield's alarm lock for cash drawers and tills we inadvertently made a statement which might create a false impression. The lock is already in the market and in the hands of a large proportion of all the leading houses.

If the electric light, either by Jablochkoff inventions, or other means, can be economically used in England, where gas is cheap, there should be no question as to profit by its substitution in this country, where gas is very dear. The price of gas in London is limited by law to $1.10 per 1000 feet of 12-candle power, and constant and close supervision keeps the quality up to the standard. The Londoners are chary of the privileges of their gas companies, and would never submit to practices which Americans peacefully endure, such as putting inferior burners in the lamps of side streets, leaving them unlighted till after dark, extinguishing them an hour before daylight, charging for gas not used, and arbitrary treament of gas consumers in general. Perhaps, however, the days of the gas companies' power are numbered. Quite recently the Exeter Town Council (England) decided to postpone the purchase of gas works, "on account of the success of the electric light and the probability of its superseding gas."

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For determining the per cent. of Pure Iron in an ordinary Ore	$4 00
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Universally acknowledged superior to any other in the market. They have recently been improved, making them, as now offered to the trade, the most perfect tools of their kind, either in design, material or workmanship.

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The very best as well as cheapest.

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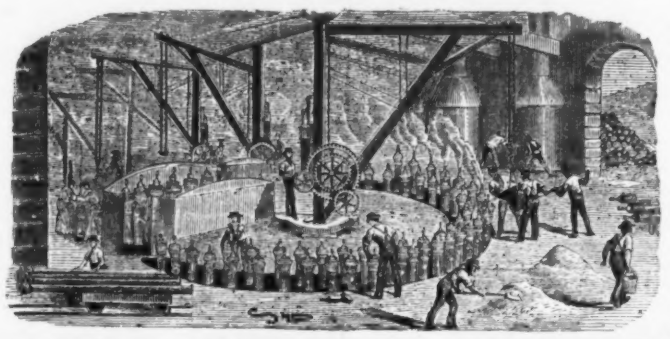

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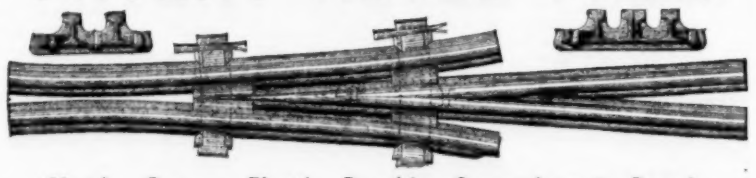

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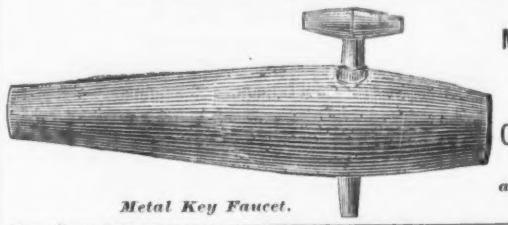

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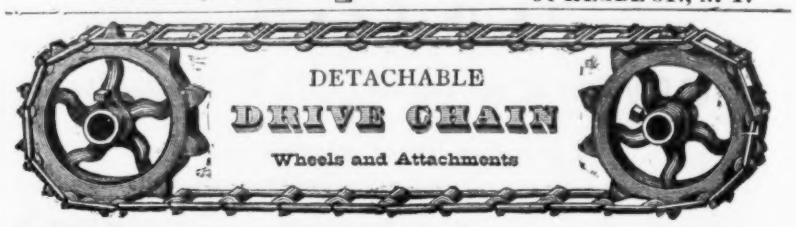

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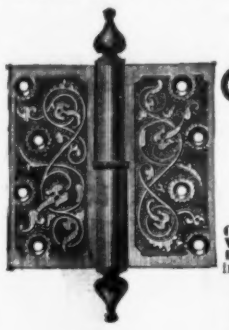

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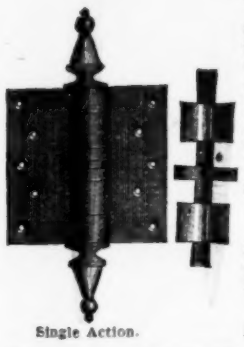

Single Action.

This Hinge has **two** flat coil springs, very powerful It has a heavy **solid** pintal, giving much less friction than a **hollow** pintal. It has broad, solid bearings in the knuckle, which do not wear down readily and let the door sag. It is Fast Joint, therefore can be used for either right or left hand. By actual test it has an average of 50 per cent. more power than other Spring Hinges in common use of same size.

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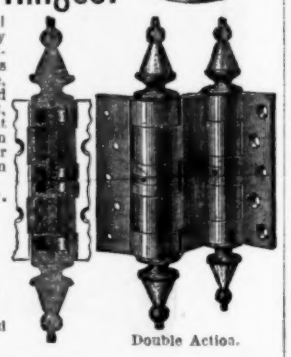

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Universal Force Pumps.

Secured by Letters Patent.

These Pumps have enormous power, and are for the house or for *out-door wells* of any depth. They are constructed with special regard to strength, ease of working and durability. They can be immediately changed from lift to force pumps, and the air chamber can be revolved, so as to allow the handle to work at any desired angle with the spout. Having close tops, they cannot be tampered with. Attention is called to our new elegant pattern **Deep Well Non-Freezing Fire Pump. Also, Blunt's Sand Vacuum Chambers**—a complete protection against sand or gritty water in *dug or driven wells, pits, mines and rivers.* For *hand* or *steam pumps*, all sizes, from 1¼ inch to 4 inch suction pipe.

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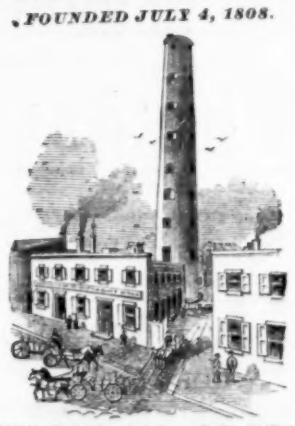
FOUNDED JULY 4, 1808.



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Premium awarded by the Judges of the Centennial International Exposition for uniformity and general good finish of Pellets.

Price, $4·80 per gross; one sample by mail, 10 cents; one each size (three sizes) by mail, 20 cents. one dozen by mail, 60 cents. For sale by wholesale dealers in Boston, New York, Philadelphia, Chicago and St. Louis.

Durability secured by Simplicity.

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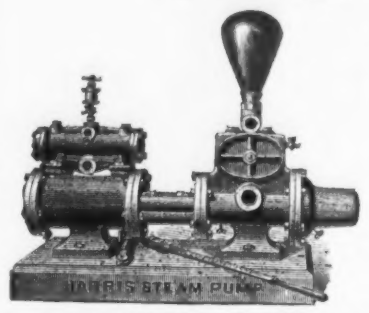

A DOUBLE-ACTING PLUNGER PUMP,

Adapted to every Situation.

THE

GREATEST EFFICIENCY

Coupled with the

Simplest Mechanism.

OFFICE OF CROOK'S HOTEL,
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READING HYDRAULIC WORKS:

GENTS.—It affords me pleasure to state that the "Harris Steam Pump" furnished by you for my Hotel is fully up to your guarantee, and is a perfect success. It pumps water to the upper story of the Hotel, an elevation of eighty (80) feet, with a steam pressure of less that fifteen (15) pounds; it is perfectly noiseless in operation, and differs from any pump that has been used by me in the same situation, in that it does not "telegraph" on the pipes running through the Hotel, and on that account alone is invaluable.

S. H. CROOK.

HEBREW ORPHAN ASYLUM,
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GENTS.—The Harris Pump purchased of you for supplying water to the tank, does the work to perfection. The pump is located about 200 feet from the boiler and raises the water to the tank, which is 65 feet above the pump. It runs very quietly, and starts just as soon as the steam is turned on. I consider it the best Pump I have ever seen for the purpose.

Yours, &c.,

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No. 87 Liberty St.,

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Send for Reduced Price List.

Japanese Paper Ware.

Centennial Award

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for the manufacture of the Japanese Paperware, Water Pails, Chamber and Commode do. Slop Jars Foot Baths and Water Carriers), Bowl and Pitcher Pans, Basins, Cuspadores, Spittoons, &c., &c.

Warehouse, 379 Pearl St., N. Y. City.

Trade supplied.

The Siemens Direct Process.

At Towcester, Northamptonshire, England, Dr. Siemens has erected an experimental works for the purpose of developing his method of making wrought iron direct from the ore. The works consist of three rotating furnaces, with their producers, a gas heating furnace, a small steam hammer and the necessary ore crushers, boilers and building, and a laboratory. It has been running, only experimentally, from time to time, for two years, and has turned out 600 tons to 700 tons of blooms, which have been sold and worked up. A charge of about 2000 pounds of ore, of a mixture containing about 55 per cent. iron, and 1¾ per cent. phosphoric acid, is put into the rotator, together with about 100 pounds limestone and 600 pounds bituminous coal. The materials are crushed to the size of large peas and smaller, and are mixed before being put into the furnace. As soon as the door is closed, the furnace is set revolving at the rate of 10 turns per hour: the air from the heated regenerator is put on full, but the gas is slightly admitted, if at all; usually it is shut off entirely. The first operation, which begins at once, is the distillation of hydro-carbons from the coal as it comes in contact with the heated walls and the hot air; there is not at first, however, enough air to burn all the hydro-carbons. In about 45 minutes from the beginning of the operation, the oxygen of the ore and the carbon of the coal begin to form carbonic oxide pretty freely, and this is burned by mixture with the hot air from the regenerator. As this combustion of gases formed in the furnace does not sufficiently increase its temperature, a little producer gas is now let in, and its quantity increased from time to time, to near the end of the operation. It is probable that the hydro-carbons only increase the temperature, and that they do not assist in reducing the ore. At this time, the charge, as it rolls over in the furnace, looks like white and black gravel and sand, white predominating. In about 1¾ hour nearly the entire charge is at a uniform yellow heat. In about 2¼ hours the particles of iron, now pretty well freed from oxygen and somewhat freed from the more fusible slag, begin to stick together and to form small balls.

In about 2½ hours the air is shut off a little in order to preserve a reducing flame, so that the iron may not be oxidized; and the air is further decreased, and the gas increased, from time to time, till the flame is quite smoky at the end of the operation. At this time the slag tap is opened and a little fluid slag is found to have been formed; a little more runs out every six minutes, as the tap hole gets around to the lowest point. In about 2¾ hours the air is somewhat more, but not entirely shut off, and the rotation is stopped for five minutes, in order to let the ball settle together, and to let all the cinder that will run out of it get to the tap hole. The furnace is then run for three to five minutes at about 50 per cent. above the usual speed, to facilitate the balling up of the charge. When these various operations occupy the time mentioned, the charge will be ready to draw in a few minutes less than three hours from the time when the ore was shoveled in. A charge of the same weight has been made in about two hours and twenty minutes.

The weight of the unsqueezed balls witnessed from one of the charges was 1418 lbs., and they probably contained 35 per cent. of slag, so that the loss of iron was from 18 to 20 per cent. The ore used is a very impure one, containing a large amount of alumina and phosphorus. With purer ore the loss might be largely reduced. With regard to the results of the process, it is believed that with suitable ores, in favorable localities, it will furnish the cheapest material for open-hearth steel that can be produced by any process now working and developed. It is proved that this process removes from ores containing a large amount of phosphorus so much of that element that the resulting iron is quite fit for the best grades of steel. The process is still in its experimental stage, and the cost of squeezed balls made by it has not been determined, but it is said that hammered billets made by it at Towcester cost but little over $21 per ton, the ore costing $1, hammer scale $4 and coal at $3; and this while laboring under the difficulties of refractory slag, reheating, excessive waste, dear freights, small product, bad handling facilities, and all the embarrassments incident to an experimental works. Whatever its present degree of imperfection, the process is certainly very attractive, because it makes pure iron out of impure raw material, to a greater extent than even mechanical puddling; because it can work up all its own scrap, and even some of its own refuse or slag, and because it requires (when proper mechanical handling facilities are provided) the minimum of labor and attention.

American Inventions in England.—A correspondent, speaking of the progress of American ideas in England, says: "While the hotel and railroad and steamboat accommodations in all Europe are villainously bad, they are in gradual course of improvement. Imagine six people in a coop, locked in, from New York to Boston! The American traveling public would stand it about a week. Here they know nothing better except on a few railroads, where they have introduced the sleeping cars. Imagine also the Fifth Avenue Hotel without a light in it above the first floor after 11 p. m.! Here they have no gas, though gas is cheap, in any bedroom of any hotel, and some of the hotels are very grand, costing from two to five millions of dollars each. The reason is that the proprietors charge 20 cents apiece for candles, and nobody uses a candle except to light him to bed, but he pays all the same. The American idea of gas in bedrooms is about to be brought out. American sewing machine agents are everywhere. Following the slow introduction of sleeping cars, comes the introduction of heating apparatus and other American improvements for cars, electric bells for hotels, &c. You can find American canned peaches, lobsters, clams, every canned fruit, &c., in any first-class grocery store, as a delicacy. And American patent medicines, knick-knacks, &c., line the windows of the Boulevards of Paris and the streets of London, Liverpool and the other big cities of Europe. In fact, no matter what the language of the country you visit is, you find Yankee genius exhibited in some fashion within the range of your eye."

Ancient Currencies.—The Academy of Moral and Political Sciences in Paris has been entertained by some clever lectures on "The Metallic Circulation before the Invention of Money." These lectures embody the substance of a memoir written by M. Denormant, who has the merit of treating an antiquarian's subject in a popular and interesting style. Everyone knows that money was a comparatively late invention of the human race, and that the practice of exchange or barter existed very long before it in all communities. The familiar story of Abraham's purchase of a field and cave for the burial of his family affords, perhaps, the earliest instance of the way in which such dealings were effected, and the weighing out of the shekels of silver by the Patriarch is described in very much the same way as a money transaction might afterward be described at Rome. The precious metals were obviously used in a very remote antiquity as common means of exchange, but it is equally certain that they were handed over in bulk and not in the shape of coined money, and that the only way of estimating their value was by weighing them in the scales, and also testing their purity with the touchstone. M. Denormant not only shows that this practice prevailed in the earliest times to which any records go back both in Egypt and Assyria, but gives a tolerably accurate account of the weights and measures used in meting out the price of commodities. In Egypt the principal unit of value seems to have been the "onten" of copper, weighing about four ounces, and the "kati" weighing a tenth part of it. But there were ontens and katis of gold and silver as well as of copper, but it was the latter, as everyone knows, that was by far the most abundant in Egypt, owing to its vicinity to the mines of Syria. Although, however, these were the universal units of exchange, it would be a mistake to suppose that there were generally in use any blocks or pieces of metal corresponding exactly to the several weights. The custom was in each transaction to pile up the scales with rings and trinkets of all sorts. According to this theory it will be observed that the Israelites when they borrowed of the Egyptians ornaments of silver and of gold, were not only borrowing property which could easily be realized, but were borrowing what was actually at that time the nearest approach to what we call current coin.

Remarkable Artesian Well.—One of the most remarkable artesian wells in the world is that of Gronelle, in the Paris basin. It was undertaken in 1834, up to which time no successful artesian sinking had reached a greater depth than about 1000 feet. It was calculated that the water-bearing stratum sought for would be reached at a depth of 1500 feet; but that was not deep enough. The boring continued, with intervals, until 1841, when, on the 26th of February, the boring rod was observed to descend suddenly several yards. In a few hours the water reached the surface, eventually rushing up with immense violence, mixed with sand and mud. But the sand and mud soon ceased, leaving a magnificent flow of pure water, which has continued ever since. A high tower is erected, and the water rises through the pipes with sustained force and volume to the reservoir at the top at the rate of half a million gallons daily.

Iron Railway Ties in Germany.—The result of experiments on a large scale with iron railway ties having been very favorable, Dr. Achenbach, the German Minister of Commerce, has ordered that the railroads under control of the State shall now employ iron ties to a larger extent. The system to which the recommendation of the Minister refers is the Hilf long-tie system, which, according to experience, possesses great advantages, especially over the cross-tie system. The increased consumption of iron following its general employment for railway ties is of the utmost importance at the present time, when the future of the iron industry is very dark all over the world. It is estimated that 13,606,000 tons will be required for the German roads, calculating the weight of each tie at 35 kilos., or 77 lbs.

Anybody with whom there yet lingers a doubt whether Summer Schools of Science may not mean picnics and a good time generally with a few scraps of learning by way of a sandwich, may be reassured by the actual hard work required of certain students belonging to the School of Mines, Columbia College. The students referred to were twelve volunteers from the class of '78 in the department of Engineering, of which W. P. Trowbridge is Professor in charge; Henry S. Munroe being assistant Professor, with this Summer school under his immediate care. Last month the twelve went to Drifton, a town in Luzerne County, Penn., and there were set at work in a coal mine—the actual work of the miners, handling a pick, drilling the blast holes, loading the cars and the like. Among the lighter work required of them were the various constructions needed in the mine for supporting or lining the openings, and similar details of ordinary mining labor. Several days were thus spent, the proprietor of the mine, Mr. E. D. Coxe, and the regular miners in his employ all taking a hearty interest in the scheme. Each of the students was afterward required to furnish drawings and an essay from the notes taken during their labors. The experiment in education is regarded as highly successful.

The *Japan Gazette* gives a wonderful account of the public resources of that country. The Government authorities, it says, are free from any distress about finances because a coal mine has been discovered on the Ishicari River in Yezo. On examination it was found to be first-class in quality, and is estimated to be capable of producing about four hundred million tons. Calculating one ton at $1 (the lowest figure), the income will be $400,000,000. Besides, the Public Works Department has a daily income derived from railroads. The silver mine at Shisbin produces at least about $250,000 yearly, and several other mines in Sado, Fukuta, Innai, Kamaishi and other places produce much larger incomes.

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The American File Company have the exclusive right to use the Bernot process for cutting files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

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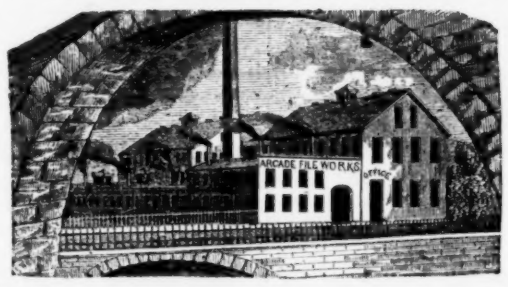

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With *wrought* Nut and Washer, together with *Patent Shoulder*, making a perfect bearing, and also clasping the eye so it cannot be twisted out of shape. The eye is bent at a cherry red heat—therefore the iron at the base of the eye is not *burnt* or injured.

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We invite the attention of the trade to our Celebrated American Horse Rasps and Files, made from the very best American Steel all cut by hand, and warranted to give entire satisfaction. All Rasps and Files not stamped as the annexed incorporated trade mark are not genuine. Sold by Hardware dealers generally.

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Best Cast Steel.

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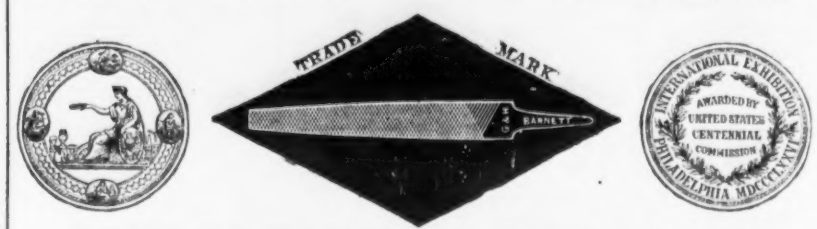

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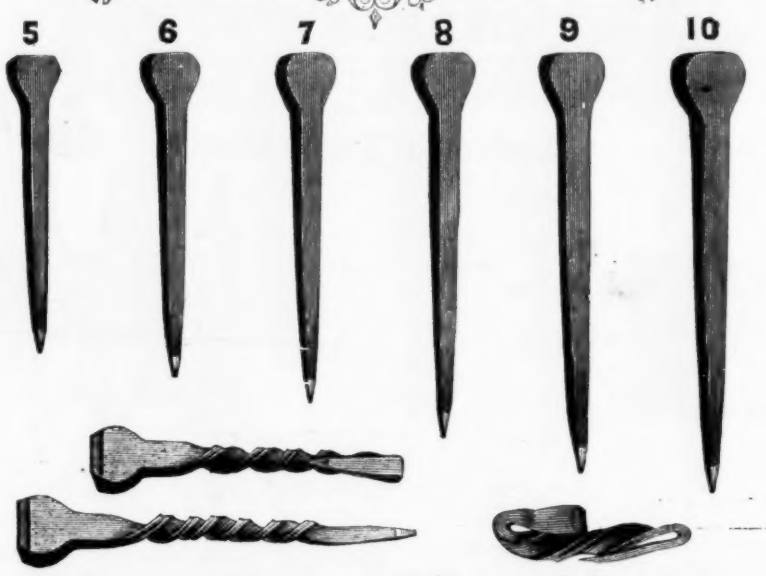

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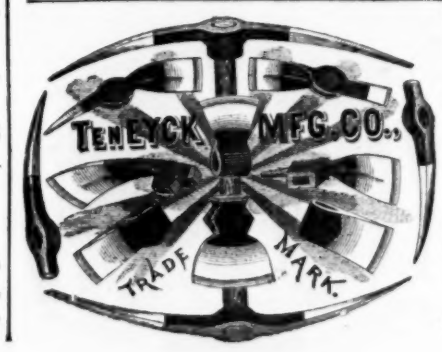

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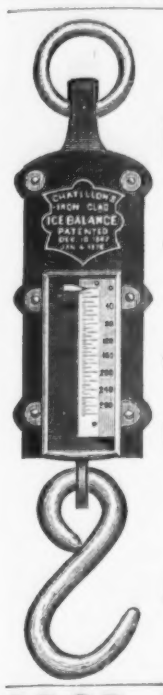

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TWO FIRST MEDALS, and TWO DIPLOMAS OF MERIT

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The Ansonia Corrugated Stove Platform, with its heavy figured ogee border, is believed to be the best Platform offered to the trade. As shown in the illustrated section herewith it requires no nailing to keep it in place or to prevent it from turning up at the edge; while the metal is of sufficient thickness to require no lining.
The low price, superior quality and fine finish of this Platform will be readily acknowledged. Packed 24 in a case.
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The Portable Bronzed Fire Screen or Shield, as shown in the illustration, is especially designed for the safety and protection of walls, furniture, woodwork, paper or varnish from heat.
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POCKET VERNIER CALIPER,
MANUFACTURED BY
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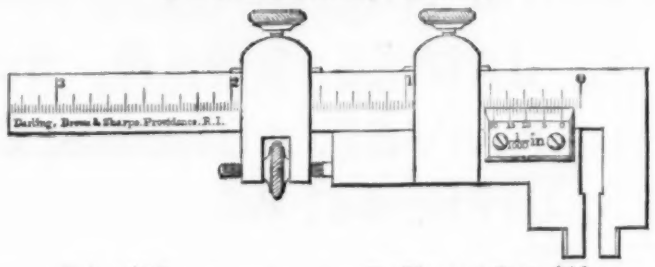

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The above cut is a fac-simile of one side of our hardened Cast Steel Improved Vernier Caliper, a light, convenient and valuable instrument for machinists' and tool makers' use in obtaining correct measurements. The side represented above is graduated upon the bar to inches and fiftieths of an inch, and by the aid of a Vernier is read to one-thousandths of an inch. The opposite side is graduated to inches and sixty-fourths of an inch. The outside of the jaws are of suitable form for taking inside measurements, and when the jaws are closed measure 250 one-thousandths of an inch in diameter. This caliper will measure one inch and eleven-sixteenths, outside diameter, when the jaws are open full size.

FRENCH MEASUREMENTS.

These instruments can be furnished with millimetres (in the place of sixty-fourths of an inch), and provided with a vernier to read to one-fortieth of a millimetre.

Improved Sausage Stuffer and Family Press.

Our illustrations present two views of an improved sausage stuffer and press adapted to the various uses of the farm and the family, made by the Silver & Deming Mfg. Co., of Salem, Ohio.

This machine is very strong and substantial, the screw having power equal to that of any ordinary screw press. It is all iron, but

Fig. 1.

is made as light as possible consistent with the requisite amount of strength. Fig. 1 represents the stuffer closed as in stuffing or pressing. Fig. 2 represents the cylinder tipped back ready for filling, with the tin strainer and perforated bottom (used in pressing lard and fruit), standing at the side. The cylinder is held in an upright position by the spring bolt at the side, and may be taken from the frame by withdrawing the bolt and pulling the cylinder forward. This

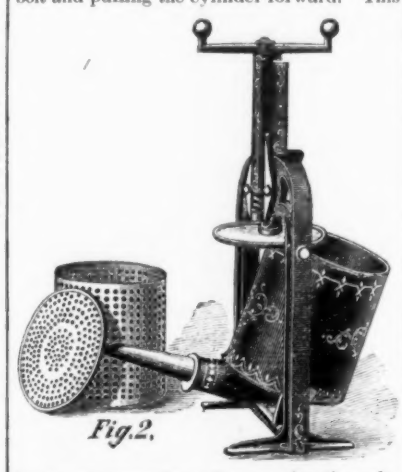
Fig. 2.

is a great convenience in removing the pulp, &c., and in cleaning the cylinder. The bottom of the cylinder has a uniform declension from all points of its circumference toward the spout, which very materially reduces the power required in stuffing. There are two plunger heads with each machine; one for stuffing and one for pressing. In pressing fruit for jelly a cloth should be used inside the strainer to prevent the pulp and seeds from passing through.

Mining Terms.

The *Pottsville Miners' Journal* publishes the following condensed dictionary of mining terms:

A Slope, Shaft, Tunnel and Drift mean subterranean penetrations at diverse angles.

A Turnout means a divergence from the ordinary line.

Rollers is a misnomer; they should be called crushers or destroyers of coal.

Breakers are properly named—a place where operators and coal are broken up.

A Lift means to go *down* about a hundred yards on a coal bed for the purpose of mining.

A Coal Basin is made of conglomerate rock, to contain the coal within it.

A Chute is where the coal is shot from the screens to the cars—generally at such an angle that it never becomes "half shot," like some of the miners or vagrant students.

A Fault is an error in the mine; some are dirt faults, some of rock; all are serious.

An Air-hole might be called the mouth, nose and lungs of the mine, through which it is ventilated, without which it would collapse.

The Crop of a Coal Bed is where it appears on the surface like a whale coming from the ocean bed appears on the surface; then only you can estimate its size and character.

Bowels of the Earth is inappropriate; stomach were better; the casting up of Vesuvius, Hecla, Cotopaxi, &c., could then be comprehended.

A Gangway is a large artery of the mine through which the coal flows, but the anatomical structure of the mine is peculiar, as here the artery is in the vein.

A Dog-hole, a Monkey Gangway and a Man-way are small contracted avenues in the mines through which the miner gains access, and means that he must stoop to conquer.

A jump in a mine shows that it is given to gymnastics. The miner would much rather have it regular and not given to antics, as it leads to serious faults and slips in its character.

Names of different varieties of coal are generally after the sizes of the thing named, as Pea, Chestnut, Egg, Lump and Broken; but not Steamboat or Furnace coal—exceptions from the rule, you know.

The dip of a vein of coal means it inclines north or south, or in any other direction. Sometimes it is vertical and has, therefore, no inclination.

A Butty is the miner's working companion in the mine, his helpmate. This does not apply to his wife, whom he generally calls his "old woman," irrespective of her age.

A Shift—night or day—is a "make-shift." After the miner has worked his eight or ten hours he has "made his shift," and goes home to change his shirt.

The miners show great penetration, and are striking characters. They are of all nationalities, and sufficient in number to form almost a nation of themselves, which might be called the In-dig-nation of this continent.

Footing is when visitors to a mine are expected to pay for the information they get. It should be applied to students who ask an editor to compile a dictionary for their benefit.

The Protection of Industry in Russia.

La Metallurgie says: "Toward the end of last month there was a rumor that the establishment of Creusot had obtained an order from Russia for 20,000 tons of steel rails. This was accepted with mistrust, since it was hardly in accordance with what we know of Russian intentions in regard to foreign railway materials.

"Russia is firmly adhering to the policy of protecting her national industries, and each year adds restrictions to importation. The government favors the establishment of metallurgical establishments and machine shops, by giving them orders at prices in advance of their foreign competitors. This is especially true of railway material.

"Through this intelligent and well-established protection Russian manufacturers have been able, without fear of the future, to establish works which are remarkably well supplied with tools, and could at present furnish the rails, tires and locomotives necessary for Russian railroads.

"The action of the government has not stopped here. In order to cut off importation, the importance of which is more and more restricted, the government has decided that hereafter, when concessions for railroads are made, the companies will be required to buy all their rolling stock in Russia. The treasury pays to Russian manufacturers for the locomotives constructed premiums amounting to 2800 rubles for each 8-wheeled engine and tender.

"We can understand that under such conditions Russia is lost as a market for France. Not only the contract for 20,000 tons which has been spoken of has not been concluded with Creusot, but, what is more, we cannot hope to ever have a similar engagement in the future."

Durability of Timber.—The durability of timber is almost incredible. The following are a few examples for illustration, selected for the *Railway Age*, from various sources, and vouched for by scientific men: The piles of a bridge built by Trajan, after having been driven more than 1600 years, were found to be petrified 4 inches, the rest of the wood being in its ordinary condition. The elm piles under the piers of London Bridge have been in use more than 700 years, and are not yet materially decayed. Beneath the foundation of Savoy place, London, oak, elm, beech and chestnut piles and planks were found in a state of perfect preservation, after having been there for 650 years. While taking down the old walls of Tunbridge Castle, Kent, there was found in the middle of a thick stone wall a timber curb, which had been inclosed for 700 years. Some timber of an old bridge was discovered while digging for the foundations of a house at Ditton Park, Windsor, which ancient records incline us to believe were placed there prior to the year 1396. The durability of timber out of ground is even greater still. The roof of the basilica of St. Paul, at Rome, was framed in the year 816, and now, after more than 1000 years, it is still sound, and the original cypress wood doors of the same building, after being in use more than 600 years, were, when replaced by others of brass, perfectly free from rot or decay, the wood retaining its original odor. The timber dome of St. Mark, at Venice, is still good, though more than 850 years old. The roof of the Jacobin convent, at Paris, which is of fir, was executed more than 450 years ago. The age of our country's settlement does not enable us to refer to examples of like antiquity, but no good reason appears to exist why timber may not be as durable in America as in Europe. Many old white pine cornices here exist which, having been kept properly painted, have been exposed to the storms of more than 150 years. The wood is still sound, and the arrises are as good as when they were made; while freestone, in the same neighborhood, has decayed badly in less than 50 years.

Firing Under Water.—General Uchatius, the inventor of the new field gun adopted in the Austrian army, has made some interesting experiments with the object of ascertaining the effect produced by firing a rifle under water. It is known, he says, that fishes, when they are not too much below the surface of the water, can be shot from the shore or from a boat. The armor plates of ships of war, however, do not usually extend any lower than from two to three meters below the surface, as beyond that depth ships are regarded as unassailable even by the largest shot. This is so, no doubt, when the shot is fired above water; but General Uchatius wished to find the result which would be attained by firing under water. For this purpose he procured a wooden raft, to the under surface of which a Werndle rifle was attached with iron clamps in such a manner that when the raft floated on the water the rifle was fired horizontally at a depth of half a meter below the surface. An attendant then opened the lock, introduced a cartridge, placed the rifle at full cock, and fired it from the shore by means of a string attached to the trigger. The target consisted of a wooden board an inch thick. The result of the experiment was as follows: There was no difficulty in loading and firing the rifle, and there was the advantage that after each shot the inside of the barrel was cleaned by the water. About thirty shots were fired without doing the smallest damage to any part of the rifle. At each shot there was a dull sound, which could not be heard beyond a distance of fifty paces, and bubbles of smoke rose above the surface. At a distance of one and a half meters no impression whatever was produced on the target; at one and a quarter meters the bullet entered to a depth of from three to four millimeters, and at one meter the target was pierced through.

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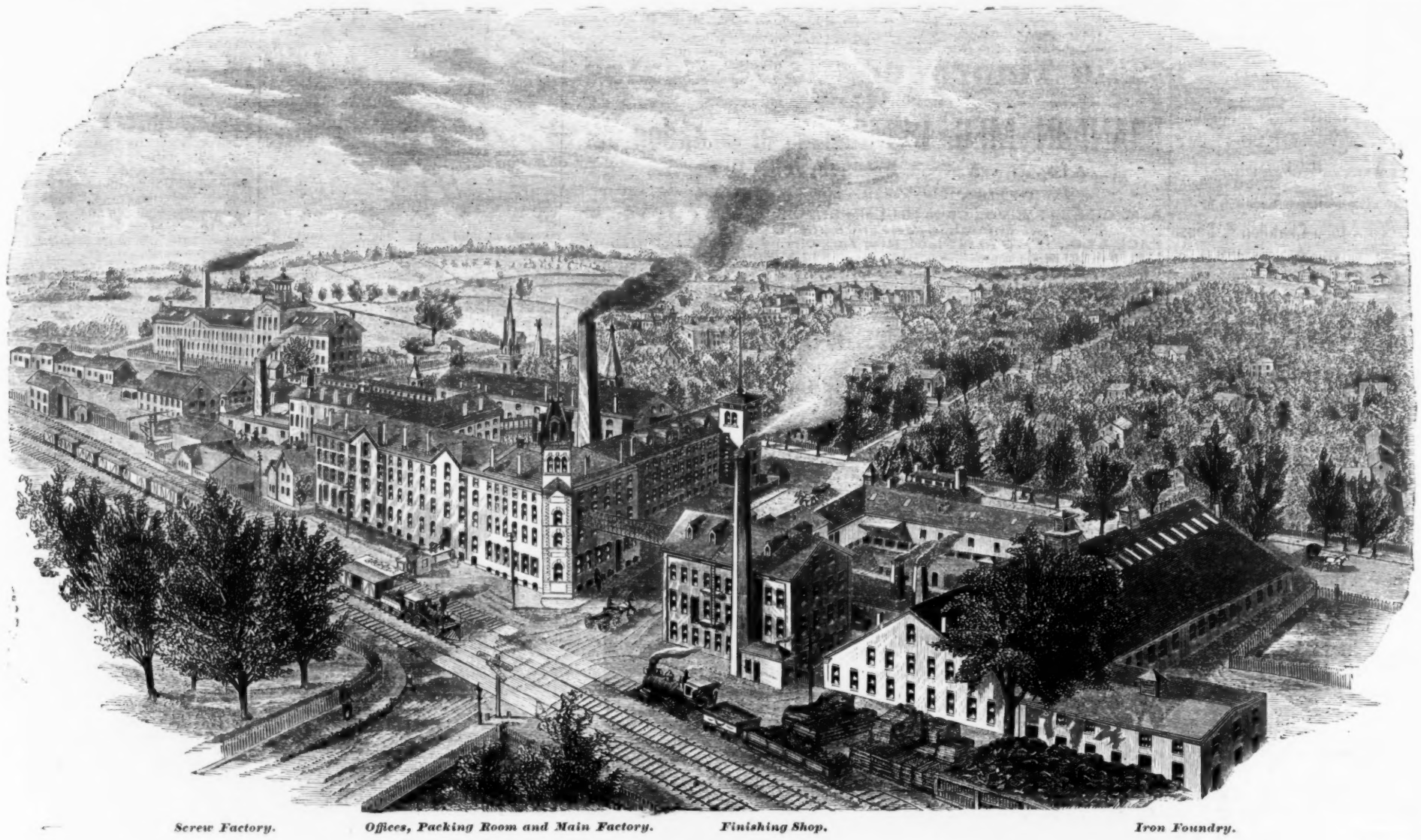

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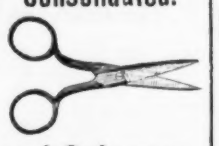

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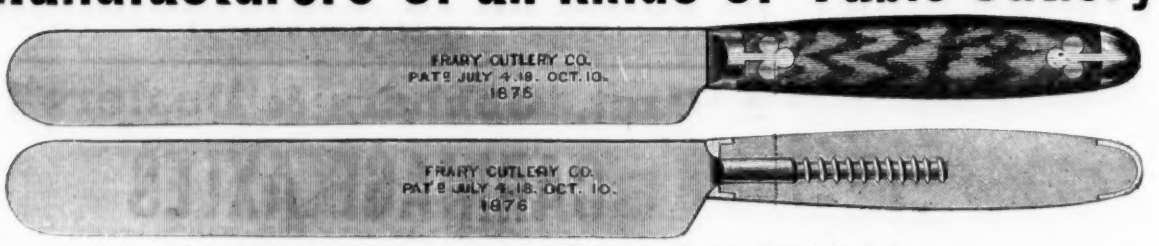

The above Illustrations represent their New Patent Screw Tang Lock Fast Solid Handle Knife.

There is no question but that a solid handle Knife is much more preferable than a scale tang. The great objection to their use hitherto is, that no solid wood handle has been placed on the market with the handle properly secured—no handle put on with cement will stand the wear and tear of every day usage. The cement will expand and contract with the action of heat and cold, and become loose, crack and come off, causing great prejudice against their use. This objection is overcome in our patent screw tang. A wood screw is welded to the tang of the Knife or Fork, and screwed firmly and securely in the handle and locked there by the bolster, making a very strong neat and handsome knife, which we warrant never to get loose, crack or come off. We manufacture a large variety of patterns, both Table, Butchers and Carvers, and furnish the patent handle nearly as low as the scale tang. We are prepared to furnish this line of goods, together with the scale tang and iron handle, very promptly, and very respectfully invite the attention of the trade.

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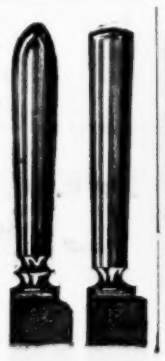

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Estimating Manganese in Spiegeleisen and Ferro-Manganese.

M. Sergius Kern, of the Obuchoff Steel Works, St. Petersburg, sends the following communication to the *Chemical News:*

Spiegeleisen and ferro-manganese are at present much used in the manufacture of steels. A great many analyses of such kind are made in laboratories of iron and steel works; very often slags from Siemens-Martin furnaces are also tested for manganese, in order to accurately ascertain at any stage of the operation the proper state of the metallic bath of the furnace.

The following method, communicated by me to the Russian Chemical Society on the 7th of April, 1877, may be for technical applications strongly recommended:—0.05 grm. of the spiegeleisen or ferro-manganese, in powder, is dissolved in 20 to 25 c. c. of aqua regia; the solution is evaporated to dryness, and the resulting mass is redissolved in a mixture of 10 c. c. of hydrochloric acid and 15 c. c. of water. The residue, consisting of silica, is filtered off. Iron and manganese are next precipitated, in the form of hydrates, by ammonia; this mixture is concentrated and poured into a platinum crucible, and evaporated to dryness. The dry mass is placed in a weighed tube of hard glass, heat is applied, and at the same time a current of dry hydrogen is passed through the tube. The following reaction takes place:

$$Fe_2(OH)_6 + Mn_2(OH)_6 + 8H = Fe_2 + 2Mn O + 10HO_2$$

When the mass turns greenish, instead of hydrogen a current of dry chloride is passed, which transforms the metallic iron into a volatile compound, ferric chloride (Fe_2Cl_3): the chloride is passed for about 30 to 40 minutes; when the iron is volatilised a free current of air is passed for about one hour. During this last operation the tube must also be heated by a Bunsen burner. The substance in the tube burns brownish, and mangano-manganic oxide is formed (Mn_3O_4). The tube in a dry state is secondly weighed, and the difference in the weights of the empty tube and the same tube containing Mn_3O_4 will show the quantity of mangano-manganic oxide in the specimen analysed. As this oxide contains 72.05 per cent. of manganese, the percentage of manganese in the sample is easily calculated. Ten analyses were executed by this process on samples in which the manganese was firstly estimated by the well-known Eggertz bromine process. The experiments proved that the difference in the estimation of manganese in the ordinary way and by the above-mentioned process varied between 0.04 and 0.01 per cent. These results show that the process may be safely used in technical and metallurgical applications. At first sight the new process seems to be very complicated in execution, but practice proved that the work is executed by this method far more quickly and easily than by any other analytical methods. Some experiments were made in order to simplify the above-described process; they are not yet finished, but altogether it may be found useful to give a short notice of them. If finely-powdered ferro-manganese is ignited with ammonium-chloride in a high crucible with a metallic cover, the ferric chloride obtained by the reaction—

$$6NH_4Cl + Fe_2 = Fe_2Cl_6 + 6NH_3 + 3H_2,$$

is volatilised, and condenses in the form of small crystals on the cold metallic surface of the crucible cover. The cover is gently put off, and the contents of the crucible are dissolved in aqua regia: silica is filtered away; the filtrate is evaporated to dryness in a platinum crucible, which is next strongly heated in the presence of air; the resulting mangano-manganic oxide is weighed, and the percentage is calculated as ordinarily. This process is far more easily executed than the process just mentioned. The analyses which are now in execution will show the accurateness of this analytical method.

Some sample pig iron produced by the New Zealand Titanic Steel and Iron Company has, according to the *Iron and Coal Trades' Review*, been sent over to this country for the purpose of being tested. The iron is smelted from metallic iron sands, which are found along the shores of Taranaki beach. On analysis it has been discovered to consist of magnetite, 71.0; titanium, 8.0; and quartz, etc., 21.0. When manufactured it has a close grain and brilliancy of polish, being regarded as a superior metal for the finer classes of cutlery and edge tools. The above-mentioned company, who have built two blast furnaces, recently sent some sample pigs to Messrs. T. W. and J. Walker, merchants, at Wolverhampton, who entrusted them for testing purposes to the Shelton Bar Iron Company, at Stoke-upon-Trent. The pigs on being broken exhibited mottled fracture. In the puddling furnace they worked well into wrought iron, and as they were slender—averaging 78 lbs. each against 1 cwt. generally—did not occupy too much time in the working and balling up. The heat was divided into two balls and rolled into a couple of 4-inch bars, ⅝ inch thick. In the process of puddling much thick cinder was evolved, which, taken in conjunction with the smallness of the quantity of pig work, accounted, no doubt, for the deficient yield. This was found to be at the rate of 1 ton 3 cwt. 3 qr. 14 lb. of pig iron to the ton of puddled bars produced, or nearly 20 per cent. loss, while ordinary good and sound pigs lose about half the percentage. The pig iron weighed 2 cwt. 0 qr. 10 lb., and the puddled bar produced was 1 cwt. 3 qr. The puddled iron was afterward worked in the bar mills in the regular way into 1 inch round and 1½ inch flat, pieces being cut off for testing in various ways. The hot testing process showed the iron to be perfectly free from red-shortness, while the cold tests showed freeness from cold-shortness. The tensile tests indicated that the iron was exceedingly ductile, the flat having contracted in area nearly 50 per cent., and elongated over 31 per cent., or 3¾ inches in a foot. The ultimate stress was also very good, being respectively 23 and 23½ tons per square inch. Most of the trials were the British Admiralty requirements for "best best" bar iron, whose tensile is 22 tons per square inch, whereas the iron in question stood 1 and 1½ ton above that. The iron is considered remarkably well adapted for the better classes of engineering and smith work, and the specimens have stood the trials exceedingly well,

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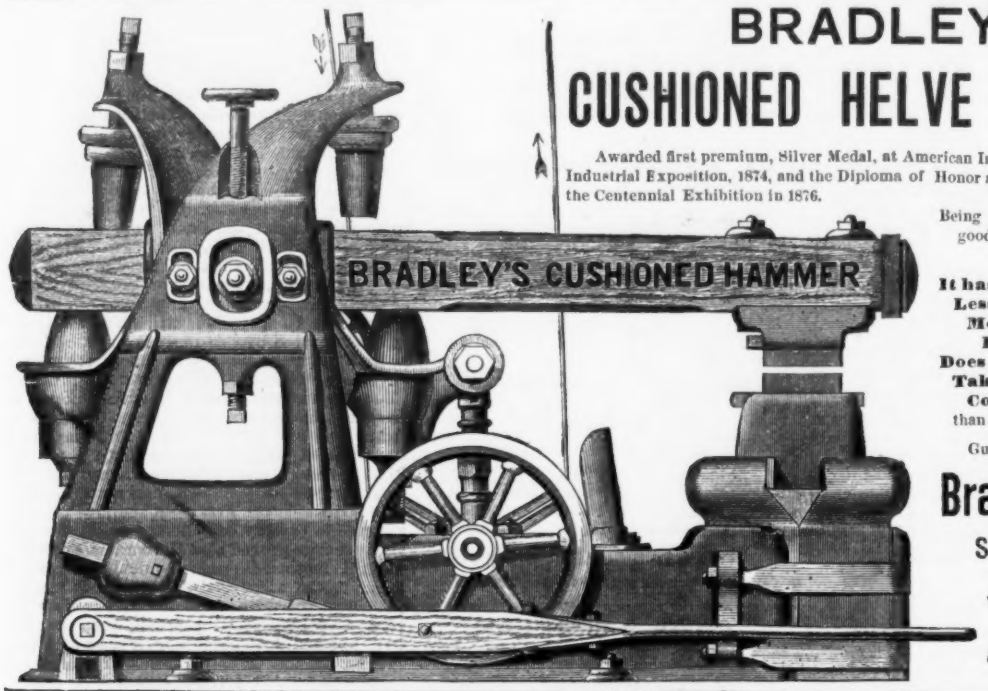

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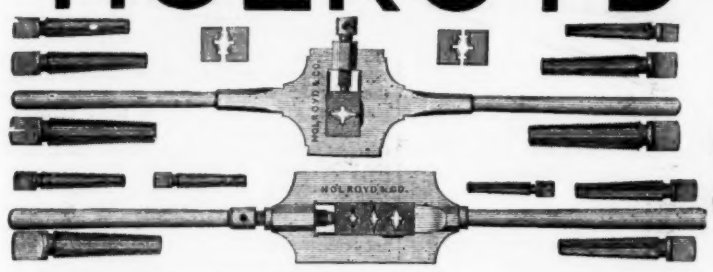

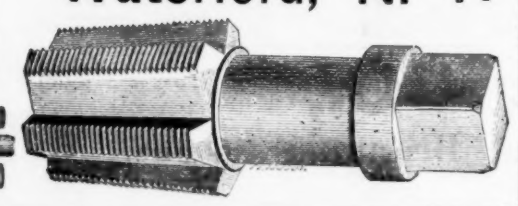

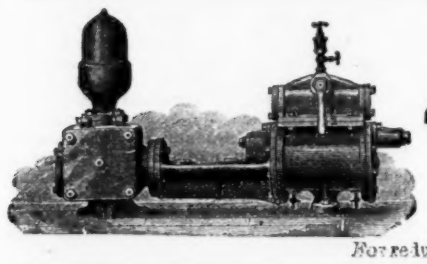

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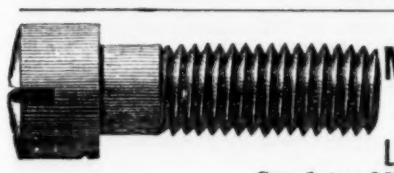

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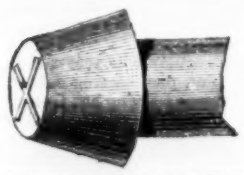

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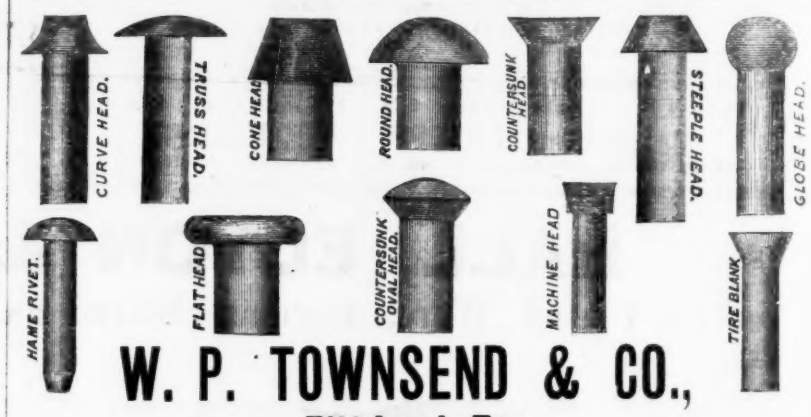

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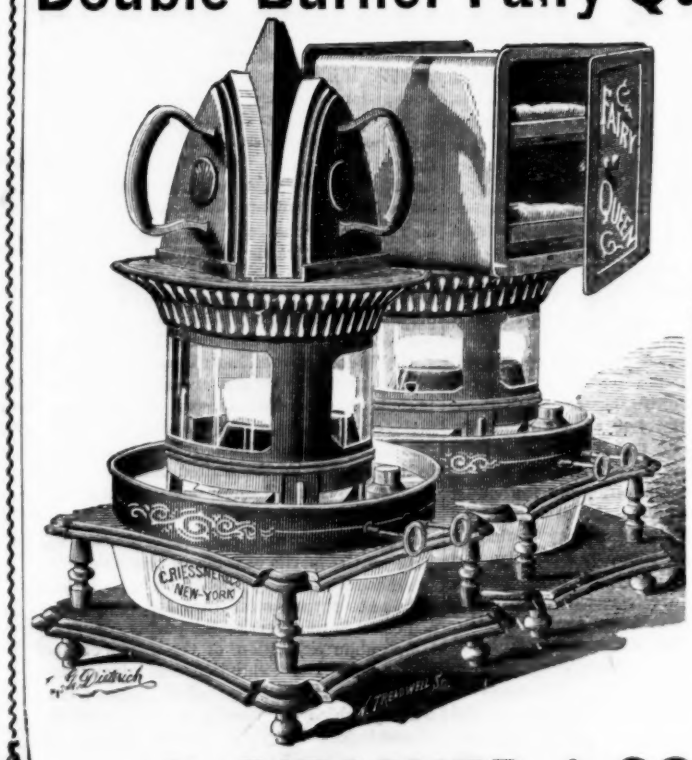

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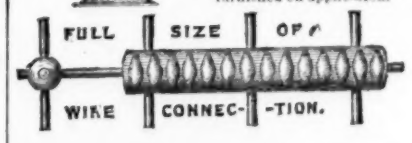

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83 Reade Street, New York.

WESTERN OFFICE.
77 Fourth Avenue, Pittsburgh.
JOS. D. WEEKS, Manager and Associate Editor.

PHILADELPHIA OFFICE.
220 South Fourth Street.
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Handling Merchandise.

The intelligent observer, strolling about the warehouses and stores of our great cities, cannot fail to be struck with the immense amount of handling which all kinds of merchandise undergoes between the time when it is received from the dock or railway station and the time when it is again sent out. The unthinking spectator and many of our merchants take this for granted as a necessary evil, inherent in "the nature of things." Our merchants either do not understand the character of the immense loss entailed by uselessly moving goods, or else have given it little attention, otherwise they would have more earnestly attempted to remedy the evil. A lot of merchandise landed on the dock or in a depot in the ordinary course, is moved by hand a hundred feet or so and piled up to wait for a truck. It may have to be moved once or twice before it is ready to be taken away. This useless work the merchant cannot control; but when, as often or almost commonly happens, no place is found in the store for the goods, the fault is certainly his. In such a case a long and unsightly pile is made upon the outside of the sidewalk, where for half a day it is a nuisance to the public; then the goods are wheeled up or down or across the walk and piled a second time. When night comes they are got under cover, but they are by no means in their proper places. They must be hoisted into a loft, lowered into the cellar, or wheeled to some distant corner of the store. In certain branches of business, where the packages of goods are small, they are often tossed from hand to hand from the truck across the sidewalk into the store, and to the bin or pile where they are to rest; and by many persons this is considered not only the quickest but most economical method of handling. This, in a sense, represents the almost universal method of transferring goods to and from the store. The truck or cart comes first, then manual labor puts the load on to a hand truck, by which it is wheeled to its place, when it is piled up; sometimes the elevator or hoistway comes in, and makes it necessary to have the goods wheeled or moved again by hand upon another story. That they must be moved by hand at all is, perhaps, a necessary evil, but to increase the distance through which they have to be carried, or the number of times it has to be done, is an unnecessary waste of time and labor. It is a useless increase in expense to stop the truck at the curbstone. The cost of carrying the load across the sidewalk is often greater than the freight for a hundred miles by rail. There is no reason why the store and walk should not be so arranged that the load could be driven directly into the store. This is possible in a large majority of cases. Again, there is no really good reason why goods once placed in store should be handled over and over again. It takes time, costs money, wears out the men, and in most cases is useless, since by proper foresight the necessity could be avoided. When goods, in the process of manufacture or in the channels of trade, are moved, it should be onward in the proper direction; they should not be allowed to travel the same ground twice, nor travel backward. This is the general rule, and the particular cases should correspond to it as far as possible. The common method of moving goods in cities by means of teams, and hand trucks for bringing goods across the sidewalks, is estimated to cost about $5 per ton, while the slowness of the operation makes the delay to business enormous. Now and then we see a large establishment which shows us what a saving can be made by having places ready for goods when they arrive, and using driveways, steam hoists and the like.

In answer to the assertion that these delays and annoyances are wrong, the small merchant often says, "It costs me nothing; the men have nothing else to do, and they may as well handle goods as be idle." This is the argument of the manufacturer who allows workmen to use dull, poor, or old-fashioned tools, because with better ones he would get through the work so quickly that a large part of the time he would be idle. It has been found in manufacturing that labor-saving pays, and in this country no manufacturer should neglect it. In commerce it is equally true that it pays to economize labor. We have seen business streets blocked for hours, when the primary cause was the fact that there was no means of taking goods off from the trucks across the sidewalks and into the store except manual labor. In such cases the individual feels the effect of the wasteful system, and has to pay for it heavily.

The remedy is not to be found in general directions to be posted on doorposts and in hoistways, like the Fire Department notices, and used for the direction of the employes. The requirements of business are so varied that each merchant must find the path of improvement for himself. The individual circumstances alone must be consulted. If the merchant will devote a day to finding out just how goods come to the store, and how they are taken away, and note the number of times they are wheeled across sidewalks, piled, taken down again, hoisted, lowered, etc., etc., he will certainly find food for thought. In some cases very little improvement is possible, but by knowing the faults of the present system and having a clear idea of the proper method, the merchant can take advantage of every opportunity in the future, and gradually bring about an improvement which will be worth having. To illustrate the needless expense to which merchants subject themselves, take the case of hoisting and lowering goods. In by far the larger part of the stores and warehouses of this city all the hoisting is done by hand. Landlords cannot afford to put in elevators, and tenants think a hoistway is all they can ask for. It is, of course, useless to expect the tenant to put in an elevator. But if an elevator is not available it is no reason that the goods should be hoisted by hand. A small steam engine and boiler can be arranged at any convenient point so as to work the ordinary "hoist wheel" without making any change whatever, except, perhaps, in some cases to lengthen the drive rope two or three feet. Such an apparatus, ready for use, with a two-horse power engine, drum, etc., could be obtained for $350, or with a smaller engine, which would probably be ample in ordinary situations, for $200. The space such an apparatus would require would not be more than four or five feet long by two in width, and the weight would not be more than 600 or 700 pounds. The amount of fuel used if the engine ran continuously ten hours per day, should not exceed 140 pounds, and with a well-built boiler any of the small first-class engines in the market will do the work on even a smaller consumption than this. Such a machine can be moved from a store, when a tenant leaves, with no more trouble than a heavy desk or a large book-case, and is applicable in almost any ordinary hatchway. In the matter of wheeling goods across the sidewalk, the use of small over-head cranes like those used for taking ashes from boiler room hoists across the sidewalk to the carts, could be made available in saving labor, and especially time, in loading and unloading trucks. These are two suggestions that come first to mind, others will occur to every merchant, and the constant effort to reduce the amount of work in handling goods, although the results may not be large in the beginning, will in time produce a marked saving.

Who Shall Pay the Loss at Pittsburgh?

The shippers who lost freight at the time of the riot in Pittsburgh are in a state of great uncertainty as to whom they shall sue to recover the amount of their losses. There are three parties who can be made defendants—the Pennsylvania Railroad, the County of Allegheny, Pa., and the city of Pittsburgh. Some have suggested that, as the trouble partook of the nature of an insurrection, and because the destruction of property did not begin until after the State troops arrived at Pittsburgh in response to an order from the governor, the State could be made a party to the suit. But however great may be the moral and equitable duty of the State to pay the loss, it is not legally responsible and could not be made a party to the suit. As the law stands it would seem that Allegheny county must pay the loss. After the riots in Philadelphia some years ago, a special act was passed by the Pennsylvania Legislature putting the loss arising from the destruction of property by the mob on the county. This was afterward extended so as to make it apply to Allegheny county also. While this is the letter of the law, there are a number of questions that will arise that may modify it, and some good lawyers think that the county can escape payment. The Pennsylvania Railroad assume to believe that the county must pay. Under date of Aug. 17 they issued a notice to those who had property destroyed that if their claims were made out according to certain directions, and forwarded to the company, they would be examined and put into shape and presented by counsel to the proper authorities of the county without expense to the claimant, the county being responsible to the owner of the goods for such loss. If it should be necessary to institute suit against the county, such suit was to be prosecuted by counsel, without charge, upon the execution of the proper power of attorney for that purpose, form of which would be furnished.

The directions called for the bill of lading, invoice, etc. This, at first sight, seemed very generous on the part of the railroad, but second thought showed that by doing this the shippers would virtually abandon their claims against the railroad, and after considerable investigation shippers are generally settling down to the belief that so far as they are concerned the suit must be againt the railroad as common carriers. The clause in the bill of lading, generally known as the "domestic violence" clause, is pleaded in bar of this view, but if we are correctly informed, the courts have decided that this does not release the railroads from their liability as common carriers. Even Philadelphia merchants have concluded to make their fight against the railroad. We also hear that some Chicago shippers propose to bring suit in the United States courts against the railroad as a foreign corporation.

We have recently had opportunities to judge of the merits of some of the so-called fire escapes in a very practical way. A few days since a gentleman with fire escapes to sell came to this city for the purpose of giving a public exhibition of the merits of his apparatus. The exhibition was given, but it was not of the anticipated character; the wire by which he was to descend parted, almost before he got below the sill of the window where it was fastened, and he fell to the sidewalk and was killed almost instantly. The usage which the apparatus received was probably quite as careful, to say the least, as it would receive in case of fire, yet it gave way with the weight of a single person after it had been slightly cut by the window sill. During the early part of the present week a very tall and narrow building in the upper part of New York took fire and was burned to the ground. A number of lives were lost, and of these doubtless some would have been saved had there been a really good fire escape. One life, at least, is reported lost owing to the failure of a chain fire escape, the chain of which became so hot that the man lost his hold, and falling to the ground was killed. It is little less than a crime for an inventor to devise such man-traps as these and pass them upon the public as life-saving appliances. It is but a short time since a fire escape and aerial ladder broke under the weight of a number of firemen who were testing it, and several were killed. Upon investigation it was found that the manufacturer had been guilty of the most criminal carelessness in the use of poor materials, cheap construction, etc.

We cannot find words sufficiently strong to condemn the inventors or manufacturers who thus trifle with human life. That they intended to do right is no excuse for them. The car builder who intended to build a strong car, but unfortunately turned out a weak one which proved a death trap, could not plead good intention to his superior officers; and those who manufacture man-traps, under the name of fire escapes, fire ladders and the like are, to all intents and purposes, guilty of manslaughter.

The Position of Tin.

Tin has now declined to the lowest point it has reached for a great many years past, and the question whether it can possibly go lower is of interest. A good many in the metal trade seem to be of opinion that the present low price will curtail production, either in England or the Straits Settlements. As regards English production from native ores, it should be taken into consideration that the mines there are peculiarly situated, and that their owners have to think twice before they discontinue or materially diminish their present output. A good deal of money has been advanced by banks on their property, and a stoppage or great curtailment would lead to a foreclosure of mortgages, a great depreciation of shares, and the throwing of a large number of miners and other operatives out of employment, spreading distress in those localities. Although a stoppage or great curtailment would probably be the most manly course to be pursued, and perhaps the least disastrous to the parties interested, they naturally hesitate, hoping that the mines in the Straits or in Netherland India will stop or curtail for them, and cause the value of the metal to recover from the present depression. They evidently overlook the cheap Chinese labor in the Straits, and the low wages of the Dutch coolies or natives in the mines of Banca and Billiton. They furthermore do not take fully into consideration that the tin resources of Australia and Tasmania are as yet but imperfectly developed, and that, to judge from late accounts received from the latter colony, fresh discoveries are continually made, and more improved methods of mining and reduction steadily introduced. If production there is so very rapidly expanding now, what may we not look forward to in the near future in that locality.

The only remedy short of a largely increased consumption which we can discover, under the circumstances, would be a great and radical change in the policy hitherto pursued by the Netherland Trading Society. This powerful company, if it chooses, may resolve upon a more conservative course, and withdraw from the market a considerable portion of its tin. Instead of holding an auction sale every other month, it may sell the usual quantity in intervals of four months, or in other words, market half the usual quantity during a year, which would have the effect of starting speculation once more in the metal, cause hesitating dealers and consumers to take courage, and in a couple of months prices would probably have risen some twenty per cent. A large portion of the stocks now in port would be transferred to the interior, and there gradually go into consumption.

But it is doubtful whether the company will care to adopt a similar policy when it remembers of how little avail it was two years ago, when it began to limit the selling price of Banca tin at its sales. Consumers took Billiton from private holders instead, and found that at the difference in price the latter was even more desirable than Banca. The company now seems resigned to meet the market as it may chance to be, producing as much as ever, and trusting to increased consumption as the price declines. Production remaining unchecked and steadily exceeding consumption, there is no saying where the decline will stop. The statistical position of tin on August 1st of the years named was as follows:

	1877.	1876.	1875.
	STOCK.		
	Tons.	Tons.	Tons.
London	9,609	7,147	5,566
Banca	2,893	2,604	3,302
Billiton	1,621	937	858
Australian	700	.....	.....
Total	4,823	10,688	9,726
	FLOAT.		
Straits	22	960	1,040
Australia	3	1,200	1,393
Banca		243	1,114
Billiton		800	1,000
Total	3	3,203	4,547

The visible supply in England and Holland was therefore 18,259 tons, against 13,891 in 1876 and 14,273 in 1875.

The deliveries in England during the seven months were this year 6,059 tons, against 7,238 in 1876, and in Holland 75,429 slabs Banca, against 63,575, and 50,775 Billiton, against 55,010 in 1876. We are informed by cable that the stock at London had, on the 1st instant, reached 10,000 tons, and that the August deliveries in England and Holland were 1700 tons, while shipments from Australia to England during August were 420 tons.

The price of straits in London was on the 1st of August £66. 10/, against £73. 10/ in 1876 and £76. 10/ in 1875; it is at present £65.

As a redeeming feature we may mention that at present prices the Chinese are taking increased quantities in the Straits Settlements, and that this demand for China may assume very large proportions in the future. It is furthermore hoped that the consumption of tin plates will materially increase while they are so very cheap, and with them that of block tin.

Colonel Scott on the Railroad Strikes.

Colonel Scott's letter on the recent railroad strikes, which appears in the current number of the *North American Review*, and is reprinted in another column of this issue, will be in many respects a disappointment to the careful reader. Colonel Scott so seldom ventures any public utterances that when he does it is expected he will say something of interest. His letter, however, throws no new light on the situation, and is practically about on a plane with the average newspaper editorial favorable to the interests of the railroad. No one knows better than he the causes and consequences of the strike. Instead of dealing with these questions, he goes over the already familiar history of the events which followed the outbreak at Martinsburg, W. Va., and then devotes himself to the elaboration of a plan by which such disturbances can be suppressed in future. His plan looks to the assumption by the national government of extra constitutional powers. His views on the rights and duties of the national government in protecting the railroads are expressed in the following paragraph:

> The authority of the United States, now potent to protect commerce moving upon the waters, should be equally potent when the same commerce is exposed to greater peril upon land. This brings us, then, to the practical question: In what shape can this protection be put so as to be extended most efficiently and with the least delay? The present regulations all favor, unintentionally, the riotors and the mob. In the first place the Mayor of a city must exhaust his power; the sheriff of the county must essay his strength; then, while precious time is expending—for a mob constantly attracts dangerous elements and grows with impunity and success—the governor of the State must be called upon by the sheriff of a county. If the State happens to have an effective military organization, which at present is the case in perhaps not more than five out of the thirty-seven States of the Union, the governor can call out the military forces and suppress the riot. If the State has no such organization, or if the military forces of the State prove inadequate to the emergency, the governor is paralyzed and must call upon the United States for assistance. If the authorities of any State should, for any cause, fail or refuse to call upon the United States government, what possible remedy or protection is left to life and property within the limits of that commonwealth?

To remove the railroads from the jurisdiction of the State courts, Mr. Scott proposes the following plan:

> The able lawyers of the Senate and House will perhaps frame a law which will give to the owners of every highway carrying inter-State commerce, whether by land or water, in which citizens of different States are interested, or carrying the United States mails or other government property, the right to appear by petition properly verified before the tribunals of the United States, in order to show that the movement of such traffic has been interfered with by unlawful combinations, by threats or by violence, and which upon such showing will give these tribunals the right, when necessary, to call upon the United States in the form now authorized by law to enforce their process by arresting the rioters and the suppression of all such unlawful combinations. The magnitude of the evil to be met and dealt with can hardly be overstated. The remedy to be provided should be equally prompt and effective.

As we publish Col. Scott's letter in full, except a few sentences of introduction, it is unnecessary to comment on it at any great length. One thought, however, suggests itself. If the president of the Pennsylvania Railroad desires, for the benefit of his corporation, to bring about what a certain class of "Statesmen" advocate as a means of holding the railroads in check for the protection of the public interest, it is evident that somebody is mistaken, and we do not think it is Col. Scott.

The Pittsburgh Workingmen and the Late Riots.

The *Labor Tribune*, published in Pittsburgh, is much pained at our remarks on the tardy repentance of the workingmen of that city for having begun the mischief which ended so disastrously to life and property. Speaking of our remarks on some resolutions deprecating the rioting and bloodshed, the *Tribune* says: "If that paper "will sit down calmly even now and examine the subject, free from the influence "which the patronage of capital might "exercise, it will conclude that the workingmen passed the resolutions because "reckless correspondents sent broadcast "over the country sensational accounts, "which foolish journals published, directly "charging the riot and destruction to the "workingmen. The latter could not well "have done otherwise than formally set the "public right; but as *The Iron Age* and many "of its contemporaries seem determined to "continue in the erroneous impressions in "which they started out, notwithstanding "the authoritative proofs to the contrary, "may be it would have been as well to have "left the resolution business severely alone."

We can scarcely think of anything more unprofitable than a discussion with the *Labor*

Tribune on any subject, but in the representative capacity in which it claims to stand, we invite it to print the following with such comment as it may see fit.

The workingmen of Pittsburgh are responsible for the riot of which they are now so heartily ashamed, in precisely the sense in which a man who fires a train is responsible for the explosion which follows. They began the disturbances, attacking the troops with their implements of toil, and when they had started the riot the more cautious stepped aside and left the roughs, the tramps, the thieves and the vicious poor to complete the work they had begun. We do not doubt, however, that the mob was at all times led and directed by men who would be recognized as workingmen even by the *Labor Tribune*, and who are to day prominent members of the union. The way in which the cars were handled as they were fired and shunted down, with thousands of gallons of blazing oil in the round house, shows that no tyros had them in charge. The same is true of every act of the mob. The whole nefarious business was the work, principally, of mechanics and railroad employes.

Now, as we said before, it is not at all surprising that the workingmen of Pittsburgh should regret the mischief done or desire to clear themselves of all blame in connection with it. It must be confessed, however, that in so doing they are giving evidence of moral cowardice. "It wasn't us" they cry, "it was the tramps and the thieves." No doubt the tramps and the thieves did their share, but the workingmen of Pittsburgh opened the carnival and led the same to the end. We should have more respect for their resolution of regret if they would frankly confess and squarely condemn their own share in it. As it is we do not believe that, as a class, they are sorry, or that they think the railroad "got any more than was "good for them."

The English papers are anything but cheerful over the hoped-for revival in business. The Manchester *Examiner* says that in textile fabrics the situation is "virtually a little worse." The prospects in India and China are not encouraging. South America and Turkey are taking heavy goods freely. Coal and iron are in a bad condition, and the blueness which has characterized them for so long still continues. The South Wales trouble about wages is not yet settled, while business in the north of England is reported at a standstill. Sheffield is still suffering from a depression in business. Iron is without demand to speak of, in spite of a slight improvement in the Australian steel orders. Collieries are running to supply the export trade, but many are idle. The redeeming feature is the cutlery trade. Large orders have been received from Australia, and a fair trade is also reported by the papers with the Continent and America. An English paper says: "The American houses are sending large consignments of spring knives which, on account of their superior quality, find a ready sale."

COMMUNICATION.

The "Decline of Pittsburgh."

PITTSBURGH, Sept. 3, 1877.

To the Editor of The Iron Age: There is no question as to the position "The Smoky City" of Western Pennsylvania occupies among the iron manufacturing centers of the country. Its tonnage far exceeds any other competing city; its production of pig iron is quite large, its production of rolled iron, exclusive of rails, is, in round numbers, 25 per cent. of the total production of the country. Of crucible steel it makes two-thirds; of all kinds of steel, except Bessemer, between one-third and one-half. The character of its product is also well known, and in many sections of the country the designation "Pittsburgh iron" or "Pittsburgh steel" is sufficient to recommend the product at once. In view of these facts, such remarks as the following are certainly of a questionable propriety:

> The decline of Pittsburgh, enterprise among our manufacturers and good behavior on the part of the workmen, will hasten a return of local prosperity in this most important and long-depressed branch of industry.

As another example of the comments of certain would-be friends, we quote from the Sharon *Herald* as follows:

> Nothing special as regards the blast furnaces—all doing well. No hopes of much of a raise in the price of pig iron while the Pittsburgh men are using so many old rails; and they will keep on using them until the 2,000,000 tons now in the market are used up—unless merchants cease buying an inferior quality of iron, and come to Sharon, where they will get a first-class brand; it may be a little dearer than the Pittsburgh article, but the quality will more than compensate for that.

Does the editor of the Sharon *Herald* mean to say, or to have it inferred, that old rails are not used in Sharon? Some old rails are doubtless used in Pittsburgh, and will, doubtless, continue to be used so long as merchants will insist on buying iron at rates less than the price of good muck bar, but there is just as good iron to be bought in Pittsburgh as anywhere if buyers will pay for it, and there are many Pittsburgh manufacturers who never did and never will use a pound of old rails.

I have used these examples of Troy, Sharon and Pittsburgh only as examples, and because I happened to run across them in one day's reading. There are doubtless other examples from other sections of the country of this attempt to account for a falling off of trade by a fling at some rival point, or to account for its increase by the decline of some strong competitor, and it is just the spirit that is seen in these extracts which fosters feelings of envy and jealousy, and breeds a sentiment of distrust that is of great injury to the iron trade. It separates competitors instead of bringing them together, and induces and fosters a lack of confidence in the words and statements of others in the same business that is to-day the curse of the iron trade. The great obstacle to better prices in the iron trade to-day is that there is not the least confidence placed in the honesty or intention of its members. The individual members of the trade don't believe that the others will keep their word, and the merchants, judging from past experience, know they won't. ***

Reports of the United States Commissioners to the International Exhibition at Vienna, 1873.

V.

The last volume of these reports contains those of Bridges, Niernsee and Derby on architecture, of Lowe on wood industries, Hinton on stone working, and of Blake and Painter on metallurgy, Blake taking the subject of iron and steel and Painter that of the other metals.

We may profitably devote the greater part of the space remaining to us to the study of the last two reports. Those on architecture are short and are devoid of matter of special interest to our readers. That of Mr. Bridges is illustrated by some fine engravings of the more important buildings of the Exhibition and of Vienna. That of Niernsee is a very excellent little treatise on the peculiar styles of architecture and methods of construction in vogue at Vienna, and gives a *resume* of the building laws of that city, to which our own architects and our legislators may turn their attention with profit to themselves and the public, as such examination might result in securing some additional security against fire. The National Board of Underwriters will find this part of the report worthy of their attention also. The report is well supplied with floor plans, and contains some elevations of fine buildings and of large and small apartment houses.

Every wood worker should read the report of Mr. N. M. Lowe on wood industries. It contains some very valuable facts and suggestions in regard to the treatment of stock and making it up. It would have been of advantage to this class of manufacturers had Mr. Lowe given them a much longer report, for which there was undoubtedly ample material. Hinton's report contains descriptions of Hunter & Fothergill's and of Holmes & Peyton's stone-dressing machines and of Young's diamond saw. He also devotes a chapter to artificial stone, describing both the Ransome stones.

Prof. W. P. Blake makes a report of considerable length and of more than considerable value. It occupies about 300 pages and contains over 100 illustrations. He quotes several authorities, giving about 15,000,000 tons as the production of pig iron per annum throughout the world, and his report shows very well how the various countries share in its manufacture and utilization.

Taking up the exhibits in order, he first describes the exhibits of Austria-Hungary. The Austrians have abundance of rather lean but very pure ores, and are making large quantities of iron and steel, notwithstanding their deficiency in fuel. They have comparatively little coal and their forests are becoming seriously thinned. In 1873, there were 129 iron works in the country, using 928,982 tons of ore and making about 325,000 tons of pig in 223 furnaces. The whole Empire raised, in 1871, 1,067,753 tons of ore and produced 400,000 tons of iron. The methods of work are, in no respect, peculiar. A large number of sketches illustrate the forms and proportions of the Carinthian blast furnaces, and another series shows the form assumed after long working. They are exceedingly instructive and will afford valuable hints to the blast furnace engineer who is endeavoring to improve the shape and proportions of furnaces. In the exhibit of the Reschiza State railroad was a collection of samples of ferro-manganese, containing from 25 to 35 per cent. of manganese, which had been made in the blast furnace from silicious ores, containing over 35 per cent. of the sesquioxide of manganese, about 20 per cent. sesquioxide of iron and nearly 30 per cent. silica. It is smelted with 15 per cent. limestone to produce the metal containing 25 per cent. manganese, and with 42 per cent. to produce that containing 35 per cent. A blast heated to 500 degrees Fahrenheit and a pressure of blast of from 2 to 3 pounds per square inch are found necessary—high figures for charcoal furnaces. Ehrenwerth's rotary puddler was exhibited in this section. It consists of a horizontal circular pan-shaped hearth, turned by properly arranged gearing, and covered with a roof to form a reverberatory furnace. A water-seal carried around the edge of the hearth prevents the passage of air. The furnace is used much as the other forms of furnace are operated. We should not suppose this to be superior to the Pernot furnace.

The German Empire made a most magnificent exhibit. It produces, annually, about 3,000,000 tons of ore and makes 2,000,000 tons of pig metal, principally in the Silesian, Westphalian and Rhenish provinces. As shown graphically in the report, the production of iron and steel in Prussia has increased with very great rapidity since 1850; and the other portions of the empire have exhibited an equally remarkable growth in this direction. There were 972 exhibitors of the metals in the German section. Among the exhibits of the Burbach works, the Phenix column was found—an unintentional and well-deserved testimonial regarding the merit of the invention for which Mr. Reeves is probably duly grateful. Krupp's remarkable display is described at length. His works, covering nearly 5,000,000 square yards and employing nearly 20,000 people, produce, of cast steel alone, 125,000 tons a year. The 250 smelting furnaces and their accessory plant, in 1872, consumed 500,000 tons of coal, 125,000 tons of coke, 113,000,000 cubic feet of water and 155,000,000 feet of gas. The latter was burned at 16,500 burners. The works have 24 miles of railway within the grounds, and keep employed 18 locomotives and 530 cars. There is also a narrow-gauge line (30 inches), 10 miles long; and on it are 7 locomotives and 270 cars. In addition to these, 200 horses are kept. Visitors to the Centennial will remember the beautiful ordnance, the fine collection of materials and the great steel ingot, which were shown by this manufacturer at the stand near the door of Machinery Hall.

Prof. Blake gives a short description, with illustrations, of the Buttgenbach Blast Furnace. This furnace is claimed to present exceptional facilities for repair while in operation, and is well deserving of careful examination by furnace builders and managers. At page 98, we find an account of the provisions made at Georgs-Marien-Hutte for the promotion of the welfare of the workingmen of that place which we heartily recommend to the attention of those among our capitalists and manufacturers who have at heart the interests of their employes, and would also urge those who care only for their own profits to study it, and consider how far such care for their working people is likely to result in pecuniary gain by preventing that now general uneasiness which has cost so many millions of dollars by its indirect effect during the last few weeks. The workmen are, at this place, assisted to build comfortable houses, are furnished with good schools for their children, a church, a technical school, library, special courts of justice, and a hospital. A workingmen's association provides for the sick, under the supervision and regulation of the company employing them, and a "store union" enables them to secure the necessaries of life without paying middlemen. Even a club house is provided at which the unmarried can spend their evenings singing, reading, bowling and practicing in a "turn-halle." It would be well, we think, for our large manufacturers to consider how far it would be to their advantage to set up their establishments at a distance from the large cities where their men are subject to so many temptations, and by thus providing them pleasant and profitable occupation for their leisure hours to endeavor to secure immunity from the serious losses, and no less serious annoyances, which are now consequent upon their most unfortunate surroundings and their ignorance and discomfort.

Passing over the description of the great works of Schneider & Co., of Creusot, which are a French reproduction of Krupp's establishment, in magnitude and in the value and beauty of their products, we may note only that the qualities and the classification of Creusot steels should be studied by every steel manufacturer. Complete tables of the properties of the several standard grades are given by Prof. Blake. These tables of physical properties were determined by a series of tests extending over a long period of time, and are exceptionally valuable and accurate. The MM. Schneider are among the very few manufacturers who have yet learned the importance of knowing, by actual experiment and test, just what they are putting on the market. Dissatisfaction oftener arises on the part of the consumer from a mistake made by the maker in furnishing him the wrong quality of metal than from the presence of a real defect in the material itself.

Blake describes at length the great Belgian works at Seraing, with its four coal mines, five blast furnaces, its ten Bessemer converters, employing 10,000 people and 254 steam engines, and its products valued at $6,000,000 annually. He next devotes a long chapter to the iron and steel industry of Sweden, and gives a very excellent translation of Ackerman's memoir upon the subject. This chapter will interest our steel manufacturers. The results of Kirkaldy's experiments upon Fagersta steel are given in detail. Chapters are given to the exhibits of Spain and Russia and of Great Britain. In the latter we find a description of the Whitwell hot-blast stove, illustrated by engravings.

In the chapter describing our own exhibits we find some statistics of production of the Lake Superior ores, and of those of Essex county, N.Y., and other localities, and some statistics of the iron and steel manufactures of the country. Park Brothers' steel and the Sellers puddler are also referred to here.

Perhaps the most directly useful chapter in the whole report is that in which the process of hydraulic forging is described, as it has been perfected by Haswell at Vienna. This system is as highly commended by Prof. Blake as by Prof. Thurston. It consists in forging iron or steel, at the welding heat, into dies, as in drop forging, but by the steady pressure of an hydraulic press instead of by the sudden action of a falling hammer. This method has been applied with perfect success by Haswell to the formation of nearly every detail in locomotive work which can be made in wrought iron, and also to many which cannot, by any ordinary method of forging, be made of that metal. Haswell's description of his method and apparatus are translated, and are given with all his illustrations. This is the most complete account of this process which has appeared in the English language.

Some of these illustrations, which have been reproduced by photo-lithography, from original drawings, printed from the etched surfaces of the pieces represented, are exceedingly interesting, as showing how the flow of the metal had occurred under the action of the press. Haswell makes, by this process, journal boxes, link-blocks, cross heads, locomotive wheels and cranks, and even his cylinder heads. In the last chapter of Blake's report we find, reprinted from London *Engineering*, a long and interesting account of the Ilsenberg foundry and a treatise on art-work in cast iron. It is to be hoped that it may not be long before this class of work is introduced into this country. Nothing will do more toward insuring the uninterrupted prosperity of our people than the introduction of new industries and the extension of application in those already established.

The report on the metallurgy of lead, silver, copper and zinc is also of considerable length, and is replete with new and valuable information. Its author, Mr. Howard Painter, was a very talented and promising young metallurgist; he completed his professional preparation by studying several years in Europe, and, soon after the completion of this report, commenced the practice of his profession in the mining districts of the West, where he has lately died. This is, so far as we are aware, the only literary work which he ever attempted, and its study indicates how much might have been accomplished had he lived by one who made so excellent a beginning. His death is a great loss to the profession and to the country. In the report a chapter is devoted to the exhibits and to the metallurgical methods of work of each of the principal of the metal-working and mining countries. The greater part of the space is, in each chapter, given to the description of the later and most successful processes of reduction and separation. In chapter 1, we find an account of the process of zinc desilverization adopted by the Germania works in this country; in chapter 3, is a description of Rozan's method of refining silver-lead; in chapter 4, are accounts of the methods practiced in Italy and Belgium, in lead-smelting. The larger part of the whole report is occupied by descriptions of the metallurgical methods of lead and silver reduction practiced in the various mining districts of Germany. These processes are, in many cases, already familiar to those of our metallurgists who have studied abroad, but they are, nevertheless, an extremely valuable addition to this report. The descriptions are very full, and are accompanied with statements of cost, as well as efficient in percentage of metal obtained. The appendix contains tables of statistics of production, and a full translation of the Saxon regulations for the purchase of ores at the government smelting works.

The general index to the reports occupies the last 85 pages of Volume IV. All the reports have been supplied with very complete indices by the editor; and this general index is evidently an attempt to make a model of this indispensable key to such a varied and extensive mass of information. Every subject—and this means nearly every paragraph in the whole 3500 pages—is indexed by article, page and volume, and by the alphabetical designation of the report containing it. Where a subject has several key-words, it is indexed under each. The reports are also indexed by authors, names, and again by titles. A good index is an absolutely essential appendage to every technical work; but we seldom see that fact so fully recognized by an author or an editor as here. Professor Thurston has evidently appreciated the importance of this detail of his work, and has not allowed this great mass of technical knowledge to go before the world, as is so often the case with technical literature, without perfecting this essential feature of such a publication. We have written enough to indicate to our readers the character and extent of these reports; and it is almost superfluous to add that the volumes constitute one of the most important publications that has ever issued from the government press.

Patent and Protective Tariff.

The *Polytechniche Zeitung* says: "It is beyond a doubt that the protection granted by means of patents stands in intimate connection with the protection of the industry through the tariff. The patent develops the individual power of the individual, while the protective tariff secures the development of the whole community. American inventions would never have reached their present importance without this system of protection, because it was possible only after the home market had been made secure to obtain a quiet, careful development of invention, undisturbed by an envious and fluctuating competition. A glance at the reports of the secretaries of State to Congress, upon the condition of the Patent Office, teaches us that a greater or lesser tendency in America toward free trade or a protective tariff produced corresponding fluctuations in the number of patents for inventions. From the year 1790 to 1807 the number of patents granted per year slowly increased from 3 to 99. In 1809 a form of protective tariff was adopted, and the number of patents rose to 203 in one year, and in 1812 even to 238. From 1816, when the tariff was lowered (a state of things which it was soon found could not be tolerated), the number of patents began to diminish. In 1818, to be sure, the number of 222 was once more reached, but it then fell off to 155. The period from 1817 to 1824 shows not an increase in patents granted, but a considerable decrease. But the partial restoration of the tariff in 1824 was sufficient to raise the number of patents, and in 1828, when the protective tariff again came into force, the number of patents was increased to 368, and in 1832 reached 550. During the period of 1835–1842 no increase can be discovered, the number varying between 435 and 517. The short period of protective tariff up to 1846 increased the number of patents to 619. This was followed by the Dallas tariff, which was not unfavorable to certain branches of industry. During this time immigration into America was very great, increasing the population 10,000,000 (nearly one-third) in ten years. The influence of this immigration is plainly seen in the number of patents from 1852 to 1860, which reached 4000 and more. The protective tariff in 1861 comes into the time of the civil war, but, in spite of the latter, the increase of patents is rapid, and the number reached in 1865 was 6616. After the conclusion of the war, in 1866, the number of patents rose to 9450, and since 1867 has been constant from 13,000 to 14,000 a year. The increase in the population during this period (amounting to nearly 11,000,000) undoubtedly exercised some influence in this regard, but nevertheless the greater increase in patents during the Morrill tariff cannot be denied. From these observations the intimate connection between patent and protective tariff is evident, and we can say with good reason that invention is only active when the industry and commerce, for which the patent works, is in a condition to utilize and bring to bear the value which the patent offers.

On the other hand, England is an example that patent laws alone are unable to produce such a progress if unaided by a protective tariff. The inventive genius of England since 1850 has not kept up its former progress, but has, on the contrary, been left behind by other nations; while previous to that time it stood ahead of all others.

Active preparations are going on for the immediate commencement of the work of Draining The Zuyder Zee in Holland, a project which for a long time has been seriously contemplated. A dam of 40 kilometers (24 miles 1504 yards) long, and 50 meters broad at its base, is to be carried across the gulf, built up to the height of 2 meters (6 feet, 5 inches) above the ordinary level of high tide. Upon this pumping machines of 10,000 horse-power will be erected, capable of pumping up from the inclosed sea and discharging on the outside of the dam 6,500,000 cubic meters (229,515,000 cubic feet) of water daily. Taking the average depth of the water at 4½ meters (14 feet 8 inches), it is estimated that the work of pumping will be completed in about 16 years from its commencement. The total cost of reclamation is set down at 335,000,000 francs; but, huge as this sum is, the undertaking is confidently looked upon as likely to prove a most remunerative speculation. The success of the scheme will add to the kingdom a new province 195,300 hectares (or nearly 500,000 acres) in extent. Judging from previous experiences in connection with the Haarlem Sea, it is reckoned that at least 176,000 hectares of the land thus won will be applicable to agricultural purposes, which at an average value of 4000 francs only per hectare, or about $300 per acre, will richly repay the enterprise and treasure lavished on this gigantic undertaking.

Mr. Samuel J. Cresswell of Philadelphia died in that city at his residence, No. 236 North Twelfth street, on Wednesday, 29th ult., aged 76 years. Mr. Cresswell was well known as the founder of the Eagle Iron Foundry, Fo. 816 Race street, which he conducted for about thirty years, retiring about ten years ago, when he was succeeded by his son, Samuel J. Cresswell, Jr. Mr. Cresswell was a member of the Common Council from the Tenth Ward for several years, and enjoyed the entire confidence of the people of the ward. He was educated for the Baptist ministry, and was a leading member of the Baptist communion.

"Iron-Steel." Messrs. Asbeck, Osthaus & Eicken, of Hagen, in Westphalia, manufacture a metal composed partly of steel and partly of iron, to which they have given the name of "iron-steel." The novelty in the process of manufacture consists in the introduction of a sheet of iron of slight thickness between the surfaces to be united. A mold for casting is divided into two compartments either by means of a transverse metal plate or by a tube placed within it, and the two metals are poured each into its compartment. Before fusion both the metals are submitted to a complete refining process, which frees them from all matters which would interfere with their union. After this they are poured into the mold, where the partition of the iron plate serves at the same time to prevent their mixing and to facilitate their union by becoming partly fused. The success of the operation depends greatly on the preparation and composition of the mold, and on the thickness of the plate, which has at the same time to stand a high temperature without burning and to undergo a partial fusion. The thickness has to be ascertained by experiment and depends upon the size of the ingot to be produced. Metal prepared in this manner is said to be adapted to the manufacture of rails, machinery, and all tools which have to support or transmit a considerable pressure or to encounter sudden and powerful resistances, for roll cylinders, &c. It combines a great tenacity, due to its firm texture, with a hardness on all the surfaces exposed to friction.

The *American Stationer* has the following bit of history in regard to pins: "In 1614 the London pinmakers, desiring to obtain a charter of incorporation, promised Sir Ralph Winwood $20,000, or a moiety of the profits on the commerce of pins, if he would use his influence in their behalf; and two years later they got their charter confirmed, securing the sole pre-emption of foreign pins, which were forbidden to be landed at any port but that of London. At this time they were associated with the wire makers and girdlers (makers of girdles or belts), but in 1631 were, at their own desire, separated from them. In 1635, upon the renewal of the privileges by Charles I., the pinners covenanted to pay his majesty $2500 a year forever, which Charles disposed of by giving it as a pension to his Queen. Charles II. confirmed this charter upon regaining the throne, and subsequently entered into a contract with the pinners, by which he bound himself to raise $100,000 to provide a stock of wire, and to take all the pins they made at prices fixed by the Lord Treasurer; the pinners, on their part, undertaking to deliver 70,000 pounds weight of ordnance half-yearly to the master of ordnance (receiving $50,000 at expiration of the contract), and to pay $2500 a year to Sir Edward Butter, and a fifth of the amount to Sir William Killigrew—that couple of gentlemen making a nice thing out of what Killigrew called the 'pin business.'"

Contrary to the somewhat popular belief, Mgr. Salvado, a Benedictine missionary, in an account of the natives of Australia, gives his opinion that they can be considerably elevated in civilization. He bases his views mainly upon the readiness with which the aborigines learn European languages. Mr. Carmichael brought Salvado's investigations regarding the Australian race and language before the Anthropological Society, London, lately, and submitted at the same time copies of letters in Italian, written by native Australians, who were brought to Europe when 11 years of age. This subject is one of not a little interest, and it has created some discussion in the society.

A telegram from Keokuk, Iowa, to the Chicago *Inter-Ocean* says: "The government canal around the Des Moines Rapids of the Mississippi, extending from this city to Montrose, a distance of 12 miles, is so far completed as to admit the passage of boats. The work has been a stupendous one, embracing a series of years in its construction and costing millions of dollars. The opening of so important an improvement demands public recognition, and the citizens of Keokuk are now arranging for a grand celebration in honor of the event. The first boat through the canal will be the government steamer Montana, and the passage will be made Monday or Tuesday of next week."

Steam Fuel from Anthracite Culm.

We visited a few days ago the works of the Anthracite Fuel Company, at Port Ewen, on the Hudson, a mile below Rondout, and examined the very interesting process of making block fuel from Anthracite waste or culm. The works occupy the docks and site formerly used by the Pennsylvania Coal Company. The main dock occupied by the Fuel Company is 600 feet long by 110 feet wide, and is surrounded by water, thus affording a water frontage of nearly 1500 feet.

The "plant" consists, in addition to the dock and shipping facilities, of buildings for the raw materials, engine and boiler houses, and a double system of machinery for production.

The process of manipulation and manufacture is brief, simple and entirely automatic. The coal dust, or "culm," as it is universally known here, is brought in boats via the Delaware and Hudson Canal, from Honesdale, where it is made by the breakers, or by cars from the mines at Carbondale to Honesdale. The culm made by breaking and screening on the docks at Rondout forms a portion of the supply. The loaded boats come directly under the company's elevator, on the river side of the dock. The dust is discharged by this elevator, and carried to a height of 60 feet, where it is distributed by chutes to the culm receivers. This elevator in construction is somewhat similar to a grain elevator, but simpler and stronger, and its work is both rougher and heavier, the culm at times proving as intractable to handle as wet sugar. Its capacity is 30 tons per hour. The culm receivers are situated at either end of a building of heavy yellow pine, 72 feet long by 24 feet wide. Their capacity is 260 tons each. In the center, between the two culm receivers, is the "pitch" receiver, which holds the material used in fusion with the dust. This compartment has a capacity of 140 tons.

There is no previous preparation necessary for the raw materials under this process other than the reduction of the pitch to a state of fineness equal to that of pea coal and smaller. This is done by a system of crushers, with prism-shaped teeth, it being a peculiarity of this eccentric material that it will disintegrate under concussion, even when too plastic to resist heavy pressure. When it has passed the second crushing an elevator takes it up and distributes it right and left to two funnel-shaped receivers, just behind the large pitch compartment. Here it it promptly taken off by automatic "feeds," as, if allowed to stand any length of time, it will solidify under either pressure or a higher temperature. The pitch itself is a manufactured article, being the result of the severe distillation of coal tar. In other words, it is the bitumen of soft coal. It is commercially known as "Fuel Pitch," so largely used in Europe, whence large quantities have been exported by Messrs. Page, Kidder & Fletcher, of the Palisade Chemical Works, 10 Warren street, New York, who supply this company. The average proportion of pitch used is ten per cent.

The culm having passed down through a chute at the bottom of each receiver, is fed automatically into a screw conveyor which moves it forward to the point of its union with the pitch. The exact proportion of the pitch is regulated by an ingenious feed arrangement so adjusted that no matter what speed of production is obtained the proportion will be preserved. It is also capable of speedy readjustment to meet any change in the condition or volume of the materials themselves. The pitch and culm come together at the inner end of the dry mixer, and are thoroughly mixed in that state before fusion. The material is then taken up by the machine elevator and dumped through the machine chute into the fusing cylinder, the bottom of which, in position, covers a segment of the molding table. In the center of the machine room, between the two systems, stands an upright tubular boiler of 25 horse power. This boiler sends its steam into a dryer on top, where its temperature is increased to 375 or 400 degrees, and it is then passed through a Bulkley superheater, where it is heated up to 575 or 600 degrees. It is then distributed by pipes covered with mineral wool as an insulator, to the fusing cylinders of the two machines, where through heavy cast iron nipples, controlled by valves specially constructed to resist the severe effects of very hot steam, it is applied to the materials, which results in the complete liquefaction of the pitch and in its thorough fusion with and absorption by the coal dust. At the bottom of the mixer the material is forced into the pockets of the mold table, a large horizontal wheel, moving at the speed of 2½ revolutions per minute, and containing 10 molds or pockets, 6x10x4½ inches, at the bottom of each of which is a moving piston or "plunger." As the molds are filled the pistons pass over a movable incline, capped for a wearing surface with chrome steel of a very fine grain, selected with special reference to resisting frictional ware, and also affording great tensile strength. This incline rests on a lever which runs through to the center of the machine, and is there held in suspension by a heavy rod, which is itself held at the top of the machine by four heavy rubber springs 10 inches in diameter, thus securing what has so long been sought, a system of adjustable pressure; for no matter what the consistency of the material these springs will yield to the point desired to allow the passage of the pistons. Great risk of breakage is thereby obviated. A pressure of 30,000 pounds is thus safely secured. As the pistons pass over the incline they press upward against the pressure plate, the wearing surface of which is lined with a fine grade of Black Diamond steel. This gives them their shape and solidity, and the operation of filling and pressing is continuous. As the molds emerge from under the pressure plate the pistons suddenly move up another incline, which brings the blocks of coal flush with the surface of the molding table, from which they are speedily swept off by a movable bar on to a carrier composed of the endless positive transmission chain made by the Ewart Manufacturing Company, of Chicago. This carrier, 65 feet long, delivers its load in regular order at the side of the dock where it falls into the hands of men, four at each belt, who at once stow it in regular tiers on board the boats. The blocks of coal are brick-shaped, weigh about 14 lbs. each and are hard enough to handle and stow when they emerge from the table.

The process is thus automatic and continuous, without the intervention of any labor in handling material, from the time the culm is taken out of the boats by the elevator on one side of the dock until the manufactured product is delivered into a boat on the other side.

The motive power of the works is a 200 horse-power Corliss engine of the condensing pattern, rebuilt last winter by William Wright, of Newburgh. The cylinder is 20x48, with 4-foot stroke, the fly-wheel is 16 feet in diameter, and the engine connects with the main shafting by three gears of 5½ feet diameter each. Less than half the power of this engine is required for present uses. Facing the engine is the boiler house, on the other side of the dock, containing two tubular boilers, 6x16 feet each, with 60 4-inch tubes. The boilers are of 100 horse-power each, built last winter by Messrs. McEntee & Dillon, of Rondout. They drive the engine for present work with an average of 42 lbs. pressure.

The capacity of the fuel works is 250 tons per day, running double turn. The system is capable of immediate and almost indefinite enlargement upon the grounds already occupied.

The company work under the Endres patents, three in number, of which they are the exclusive owners.

The works were erected in the winter and spring of 1876, under the supervision of J. J. Endres as constructing engineer. They were much improved the past winter under the personal management of the proprietors. The production for the season of 1877 will equal 40,000 tons, and the product has so far met with a ready sale for locomotive steaming purposes. The managers claim an unqualified mechanical and practical success, the only one yet achieved in the United States, and the first in the world to successfully adapt the dust of anthracite coal to general manufacturing and steaming purposes.

The product is a steaming coal of high uniform average, its calorific power by actual experiment and use being shown to be equal to the average of any coal used and superior to many. Its evaporative power in actual use, even in the large fire boxes of anthracite-burning engines, has been shown to be equal to eight pounds of water to one pound of fuel. No clinker results from its combustion, and clean fires and a regular head of steam are among the advantages attending its use.

After examining the works and process of manufacture, the visitors were given a practical test of the evaporating powers of the fuel. An excursion train carrying the visitors was run out over the Ulster and Delaware Railroad. An elevation of 2,000 feet was overcome in 41 miles, which was traversed in one hour and four minutes, taking the party to the highest point on the road among the Catskill's. The country through which the road extends is very picturesque and the ride was greatly enjoyed. The engine made steam on nearly all the grades, some of which are over 150 feet to the mile. During this time we watched the gauge closely and on only one grade did we notice even a slight fall in steam pressure. The entire production of the works is now taken by the railroads for locomotive fuel, but with their extension it is hoped to produce enough to supply a demand for steamboat and ocean steamer fuel. The industry is admirably conducted by Mr. L. L. Crounse, with an intelligent regard to the most systematic economy, and has a very promising future.

To this gentleman we are also indebted for some important facts respecting the

MANUFACTURE OF FUEL IN EUROPE,

which are of much interest as showing the progress and present extent of the industry abroad. Last January Mr. C. L. Du Boise, C. E., returned from Europe where, at the request of Mr. Crounse, he made a special investigation into the European processes and machinery for utilizing coal waste or slack, as it is there known. The report made to the company by Mr. Du Bois reveals the fact known only to a few in this country, that the industry is one of vast proportions, and we have obtained a brief outline of the same, feeling assured that it will prove both interesting and instructive, and that many people will for the first time become aware that the industry which has been so positively initiated at our own doors is not a mere experiment, but one which produces in Europe millions of tons of product of many millions of dollars in value.

Mr. Du Bois visited or investigated more or less fully nine different establishments in England, France, Belgium and Italy, which is less than one-third of the total number in existence. The development of the business within the past five years has been very rapid. One of the earliest promoters was the *Usine des Agglomerei*, at the mines of Charleroi, Belgium, of which Messrs. De Haynin & Co., of Paris, are the proprietors. The coal used is bituminous, and is mined almost at the door of the works. It is very soft and impure, and is washed before using. Messrs. De Haynin & Co. have furnished large amounts for the use of the French navy and other steamship service, but of late years have manufactured chiefly for locomotive use. The coal in this shape is very superior for steaming purposes, and the manufacturers formerly received as high as 30 francs per ton ($6), but owing to the increased establishment of *usines* by railway companies and other consumers, the price has declined until in November last the *bricquettes* were selling at Charleroi at 16 francs, or $3.20 per ton. The binding or fusing substance used in this establishment is the same as universally and almost exclusively used elsewhere, to wit, "fuel pitch," or the bitumen of coal tar, the residual product by severe distillation. This product, the uninitiated will please understand, is not derived from nor related to pine pitch nor coal oil. The coal tar from which it is reduced is one of the products of gas making from bituminous coal. The pitch when ready for transportation, as those who have visited the works at Port Ewen have observed, is in consistency and density very like bituminous coal itself, and is transported in bulk like the coal. The amount used for

[*Continued on page* 18.]

AMERICAN SCREW CO.,

Providence, R. I.

Manufacturers of

IMPROVED

Gimlet Pointed Wood Screws,

Patented

May 30,

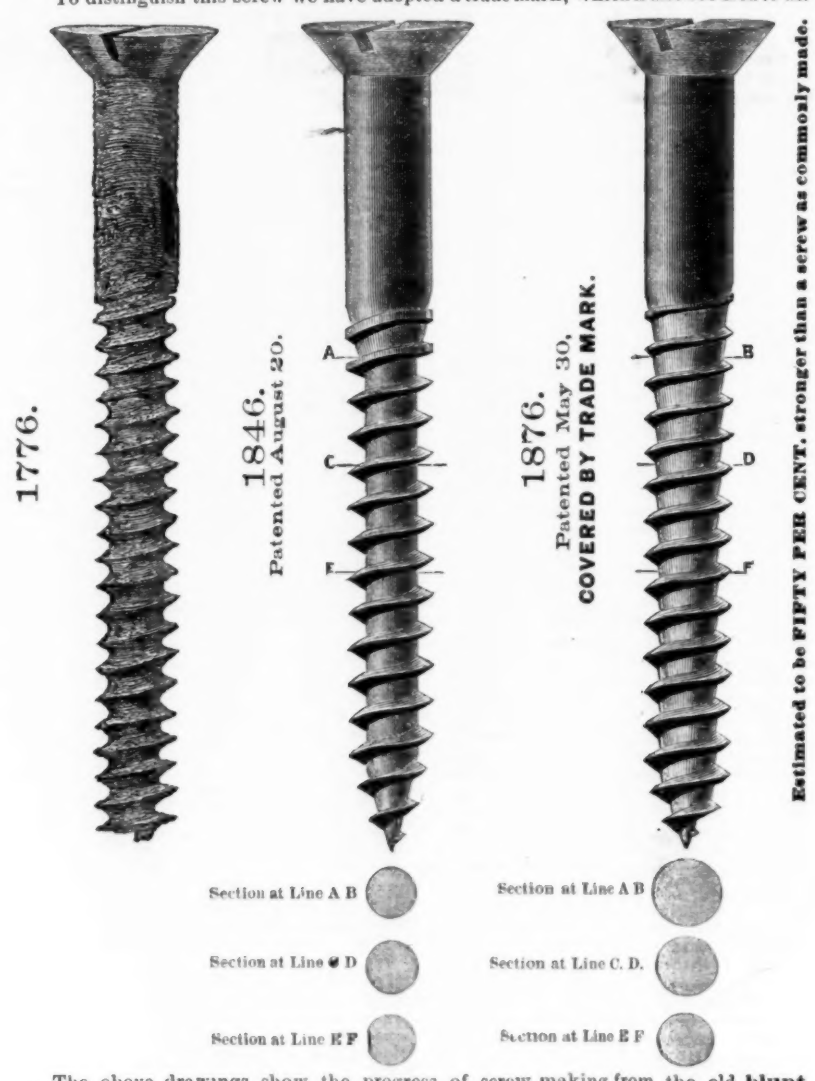
1876.

After forty years' experience we offer to the trade our **Centennial Screw,** patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the **improved** article only. To introduce them, they will be sold at same price as the old style screw.

The new screws will be packed in manila colored **boxes** with new label covering end of box, and **enlarged figures** showing plainly contents.

To distinguish this screw we have adopted a trade mark, which is also secured to us.



The above drawings show the progress of screw making from the old **blunt point** to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our **new screw** that not only is the sharp angle avoided, but the strength very much increased, as illustrated above. See sections at lines.

CLAIM.

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

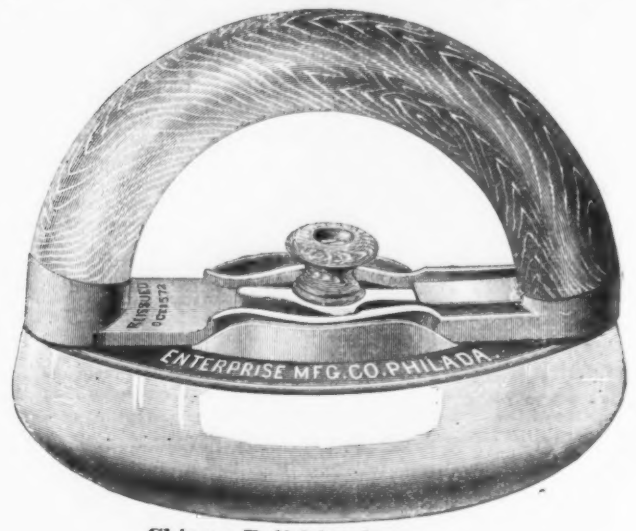
ENTERPRISE MANUFACTURING COMPANY, of PA.

OFFICE AND WORKS,

S. W. Corner American & Dauphin Sts., PHILADELPHIA.

Star Smoothing and Polishing Irons, Patent Ground.

Enterprise Cold Handle Double Pointed Smoothing and Polishing Irons, (Mrs. Pott's Patent.)



Chinese Polishing Iron.

WE MAKE

Mrs. Potts' Cold Handle Double Pointed

SMOOTHING and POLISHING IRONS.

They have a Polished Walnut Handle. They do not burn the hand. They heat quicker, and retain the same longer than other irons. They are lined with non-conducting fire cement. They are ground by patented machinery. They are handsome, serviceable and cheap. They have no equal.

Send for Illustrated Catalogue and Price List.

No. 10, Coffee and Spice Mill.

No. 3, Coffee and Spice Mill.

No. 18, Coffee and Spice Mill.

WE MAKE

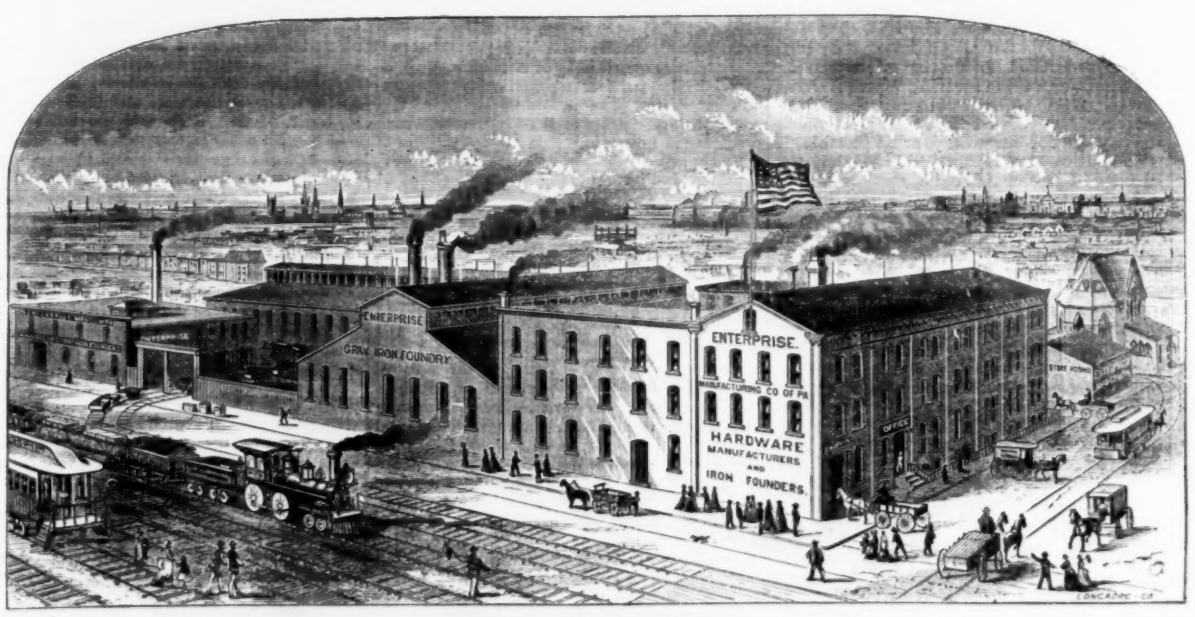
American Coffee, Spice and Drug Mills,

Sausage Stuffers,
Fruit, Lard and Jelly Presses combined,
Tincture Presses,
Self-Measuring Faucets, Champion Tobacco Cutters,
Self-Weighing Cheese Knives,
Bung Hole Borers,
OR
Hollow Augers.

Send for Illustrated Catalogue and Price List.

Enterprise Cold Handle Double Pointed Smoothing and Polishing Irons, Girls' Size.

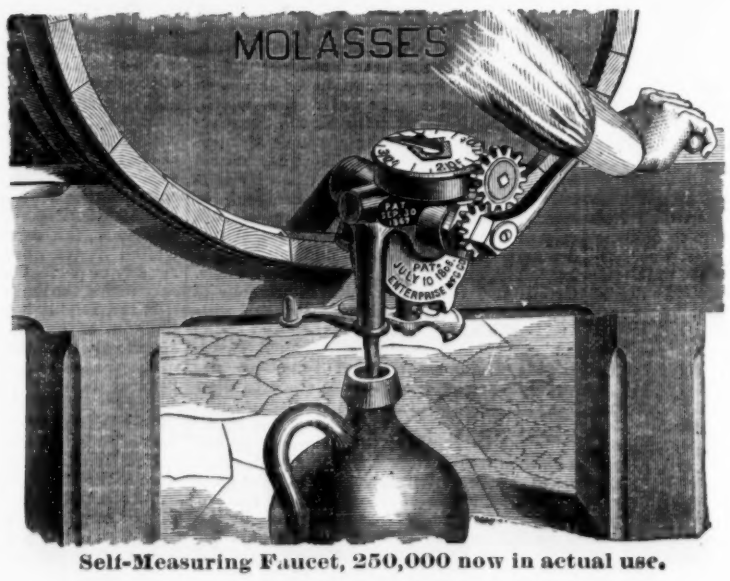
Champion Tobacco Cutter.



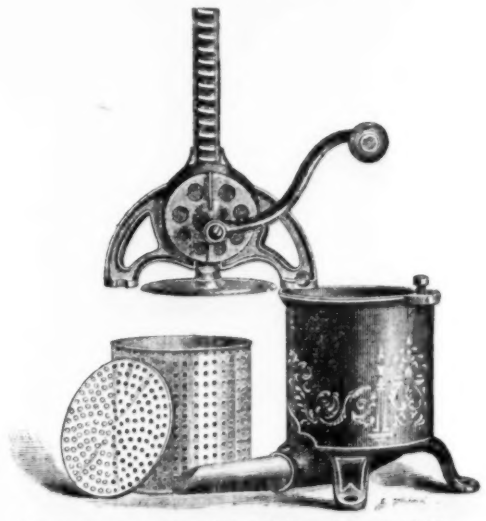
VIEW OF WORKS.

Self-Weighing Cheese Knife.

Sausage Stuffer, Fruit, Lard and Jelly Press combined, (Shut.)



Self-Measuring Faucet, 250,000 now in actual use.



Sausage Stuffer, Fruit, Lard and Jelly Press combined, (Open.)

[*Continued from page 16.*]

Steam Fuel from Anthracite Culm.

fusing purposes at Charleroi is from 8 to 10 per cent. of the weight of the coal. The Messrs. De Haynin run four machines of a capacity of from 180 to 200 tons each per 24 hours—or a total capacity of over 700 tons daily. The details of machinery used would occupy too much space for this outline.

A second establishment of like character and equal capacity is that of the *Societe Anonyme des Houilleres Mines du Bassin de Charleroi*, at Gilly, near Charleroi, where 700 tons per day are manufactured by similar process and machinery and for like purposes. M. De Clerex is director-general of this company.

At the mines of St. Etienne, on the line of the Paris, Lyons and Mediterranean Railway, the railway company have established a *usine* under the direction of M. Chaperon, *Chef de la Division des Combustibles*, for the manufacture of fuel for their own use. They produce upward of 400 tons per day by the same process. They get their pitch via Cette harbor, from England, from Germany, and even from the United States.

There is likewise another large establishment on the Valenciennes Railway, the *Compagnie des Mines d' Anzin*, at Anzin, near Valenciennes, M. De Mareilly, Director General, with manufacturing capacity of 600 tons per day. There are also the *Compagnie des Mines de Bethune*, and the *Compagnie des Mines de la Grand Combe*, with offices in Paris, who are also large manufacturers by like process and machinery, which renders it unnecessary to go into details.

One of the most interesting "plants" or *usines* visited by Mr. Du Bois was in Italy, at Novi, forty miles by rail inland from Genoa, on the Mediterranean. Mr. A. Rapallo, agent at Genoa, kindly accompanied him on his visit, which was very instructive. The fuel is manufactured for the *Strada Ferrata Alta Italia* (Upper Italian Railway), and the product is 500 tons per day. The coal dust is brought from England, and the fuel pitch largely from the United States. Messrs. Page, Kidder & Fletcher, of New York, who supply the works at Port Ewen, have shipped several thousand tons to that destination during the past two years. These works abound in heavy machinery and complete equipment. There are two machines of the upright or tangent wheel pattern, which make a wedge-shaped block, and one of the horizontal flat mold-table style. The former makes a block weighing about 11 pounds, the latter a large parallelogram-shaped brick of over 20 pounds. The mixture is the same as elsewhere, pitch and coal dust. The motive power, superheated steam and other appointments are of a first class order. The product is carried on tramways to the cars, into which it is loaded. The process of mixing is done separately from the pressing, which adds largely to the labor, but that costs but little there. Here this double process is accomplished by a motion proceeding from the same shaft. It seems remarkable that this industry should take root at such a place, but it must be remembered that fuel is a very scarce article in Italy. There are also establishments at Trieste and at Vienna, which Mr. Du Bois did not stop to inspect.

Returning to London in December, Mr. Du Bois visited the works of the Diamond Fuel Company, on the Thames, below the city. These were established about two years ago, especially to use Barker's process, which, while it makes pitch its chief ingredient, adds several other elements of fusion in small proportion. It was claimed at the time to be the only process which would fuse anthracite coal, and its introduction has been sought in this country with that view, but the complication of the ingredients other than pitch involves too much preparation for profitable working. Bituminous coal is successfully fused at these works, which turn out about 300 tons per day.

In Wales, at and near Swansea, are several like concerns, devoted to the manufacture of fuel of this character and of coke, by the same process. The coals here are semi-bituminous or anthracite, but no vitreous anthracite like the American is in existence on the other side. Some of these Welsh establishments are among the oldest and largest in the business, notably Messrs. Penrose, Richards & Company.

One of the most interesting investigations of Mr. Du Bois was that of the *usine* of the Paris Gas Company for coke dust, or "breeze," as it is technically called, at the yards of the gas companies here. It stands in the same relation to coke that "culm" does to coal. The Paris Gas Company is a huge concern which supplies the entire city with gas-light. It has several "departments" or branch works, and at one of these there is a very complete and well-arranged system for manufacturing coke fuel from "breeze" and pitch in about the same proportions as coal. This fuel is consumed exclusively by the company, who thus utilize their waste and sell their coke. The prodnct of this plant is 150 tons per day. The machinery is similar to that of the Belgian *usines*, aad the mixture is first dry and then wet, the temperature of the steam, however, being only that of ordinary wet steam at about 80 pounds pressure.

The total capacity of the establishments of which Mr. Du Bois furnishes notes is about 1,500,000 tons per annum, and reliable estimates place the production of this fuel in Europe at the enormous total of 4,000,000 of tons. Over 400,000 tons of pitch are sold for this purpose yearly, of which 50,000 tons alone are from the immense establishment of Burt, Bolton & Haywood, of London, the largest coal tar distillers in the world.

Industrial Prizes.—Among various subjects in connection with which the Industrial Society of Rouen has offered prizes are the following: A substance capable of replacing albumen of eggs in all its applications to printing of tissues, and considerably cheaper; new source of albumen, either in natural products containing it or by transformation of other proteic matters; a new dark color, as intense and solid as aniline black, but not weakening the cloth, and capable of being printed with any other colors without alteration at the point of contact; a method for volumetric determination of commercial glycerine; a solid blue coloring matter, applicable like indigo, but cheaper; new process for fixing indigo blue by steaming; new method of fixing aniline colors; a new thickening matter to replace Senegal gum; production of ozone in the concentrated state; new application of ozone; industrial production of oxygen; rapid and exact means of determining the reducing power of a coal or any carbon; utilization, in metallurgical or ceramic arts, of iron pyrites, desulphurized by roasting; process of concentration or precipitation of nitrogen and phosphoric acid in fecal matters, urine and sewage waters, yielding a manure of at least 5 per cent. nitrogen and 20 per cent. phosphoric acid.

Col. Thomas A. Scott on the Rai'road Strikes.

In the *North American Review* for September-October appears a letter from Col. Scott, President of the Pennsylvania Railroad, from which we take the following:

On the 16th of July it became known that the firemen and freight brakemen of the Baltimore and Ohio Railroad were on a strike at Martinsburg, West Virginia, and that no freight trains were allowed to pass that point in either direction. This proved to be the beginning of a movement which spread with great rapidity from New York to Kansas, aud from Michigan to Texas, which placed an embargo on the entire freight traffic of more than 20,000 miles of railway, put passenger travel and the movement of the United States mails at the mercy of a mob, subjected great commercial centers like Chicago and St. Louis to the violent disturbance of all their business relations, and made the great manufacturing city of Pittsburgh for 24 hours such a scene of riot, arson and bloodshed as can never be erased from the memory of its people.

In Baltimore, Reading, Scranton, Cleveland, Indianapolis, Fort Wayne, Columbus, Cincinnati, Louisville and many points in New York and New Jersey, the laws were set at defiance, the property of the various railway companies seized, injured or destroyed, the civil authorities overpowered or overawed, and in many cases compelled to call upon the military power of the States to protect persons and property. This call could not in all cases be fully met. The governors of West Virginia, Maryland and Pennsylvania acted with great promptness, but found the military organizations of their States, although very efficient for the suppression of any ordinary outbreak, unable to suppress what rapidly grew from a riot to an insurrection, and were compelled to invoke the aid of the United States government. To this the President at once responded to the extent of the forces at his command, and the presence of detachments of the regular army and navy, hastily gathered from all quarters and hurried to the points most seriously threatened, aided largely in securing the comparative quiet which now prevails within the borders of those States. Had it not been, however, that in many communities the municipal authorities acted with great nerve and efficiency, and were supported by organizations of citizens and by a public sentiment determined to maintain law and order at any cost, the troubles to be encountered would no doubt have been much more serious.

I do not wish, and happily it is not necessary, to fill your pages with the mere recital of the distressing cases of violence and outrage which marked the course of these riots unexampled in American history. Suffice it to say that the conduct of the rioters is entirely inconsistent with the idea that this movement could have been directed by serious, right-minded men bent on improving the condition of the laboring classes. How wages could be improved by destroying property, the existence of which alone made the payment of any wages at all possible, it is difficult to understand. Nothing but the insanity of passion, played upon by designing and mischievous leaders, can explain the destruction of vast quantities of railroad equipment absolutely necessary to the transaction of its business, by men whose complaint was that the business done by the full equipment in possession of the railways did not pay them sufficient compensation for their labor.

During the greater part of our century of national existence we have enjoyed such unbroken prosperity that we had perhaps come to expect exemption from many of the worst problems which perplex other and older civilizations. The vast area of public land open to cultivation and settlement had steadily drained off not only our own surplus population, but that of other countries, and the rapid extension of our railway system, by furnishing markets for the productions of all parts of the country, had increased the national wealth and built up a general prosperity. But for the civil war this state of things might have continued to exist; but the waste of human life and the destruction of property which accompanied that war, the loss of real productive power, and the creation of large debts, national, State and municipal, involving heavy taxation to meet them, have entailed burdens upon us which were lightly felt during the feverish excitement of the civil conflict, but the weight of which became suddenly onerous and almost intolerable when the financial condition of the country was so seriously disturbed by the panic of 1873. In a few hours the credit upon which the fabric of our apparent prosperity rested was almost entirely destroyed; the capital which had been freely lent to all enterprises offering even a show of prospective profit was suddenly withdrawn. Since that time the country has been obliged to meet its debts, not by renewals, but by actual payments from its resources. Every important industry in the country has been compelled to practice the closest and most rigid economies, in order to escape marketing its products at an absolute loss. The cotton and woolen mills of New England, the furnaces and mines of Pennsylvania, Ohio, Indiana, Illinois, and Missouri, have all passed through the same experience, and have the same story to tell. The capital which communist orators so eloquently denounce has yielded such scant returns as the men who pretend to dictate the scale of adequate wages for labor would regard with disdain. In every manufacturing State in the country it is perfectly well known that many establishments have been kept in operation simply that the men might be employed. This has been done often without one iota of profit to the owners. During the last winter the large rolling-mills in Pennsylvania must have been closed, and thousands of laboring men reduced to idleness, and possibly want, had not the railroads—which, during the recent madness that swept over the country, were selected for mob violence and opprobrium—come to their relief by anticipating their wants, and by giving orders for rails months in advance of their actual requirements. Political economists may object that it was not an act of charity in which great corporations had any right to indulge, but it is certain that without this thousands of laboring men in the State of Pennsylvania alone would have suffered severely.

Not only this, but in order to aid the industries which are now so much depressed, and to enable manufacturers to continue business and thus keep their men steadily employed, the railways of the country have reduced their local freight charges to the lowest point ever known, and have moved the heavy materials used in making iron, steel, glass, and other products at rates barely above the actual cost of transportation; and yet, by a curiously inverted process of reasoning, the course thus pursued by the railways has been most bitterly denounced by the self-constituted mouthpieces of the very classes which have alone profited by it.

It is safe to assert that so far as the special class of railway employes, firemen and freight brakemen is concerned, there are, perhaps, but few railway companies in the United States which are not to-day employing a force of train hands larger than their actual business requires. With the falling off of revenue from traffic, the question was presented at once to railway managers, whether the force employed on the lines should be reduced to that actually necessary for the work to be done, in which case greater compensation might have been paid to the men so retained while others equally deserving must have been turned adrift,—or whether it would not be both wiser and kinder to retain as many men as possible in the service, by so allotting the work as to permit all to earn a sum, smaller indeed than in the past, yet it was hoped sufficient to support themselves and their families during the severe period of depression, to the near close of which railway managers, in common with all the business men of the country, perhaps too confidently looked forward. This course, as I have said, may be condemned by the hard rules of political economy. The experience of the past few weeks seems to show that it has commended itself as little to those whom it was intended to relieve, and to whom alone, if anybody, it has been beneficial.

It must not for a moment, however, be understood that the greatest portion, or, indeed, any considerable portion, of the outrages upon life and property which have disgraced our recent history were actually committed by railway employes. It is not true that the majority, or even any large portion, of these men have been disloyal to the trust reposed in them. Probably ninety per cent. of the men on all the important lines of the country where strikes occurred were faithful to their duties, and either remained at work or stood ready to resume it as soon as they were relieved from the actual intimidation to which they were subjected by the rioters and their leaders. It was the dissatisfied element—which exists in that branch of industry as in all others—which perpetrated, or allowed the perpetration of, most of the overt acts of violence, such as stopping trains, forcing men therefrom, uncoupling cars, disconnecting engines, and other lawless doings of the kind, and which made itself amenable also to the charge of directly attacking the interests of the government and society at large, as well as of the railway companies.

As General Hurlbut, of Illinois, so forcibly expresses it, in a paper recently published, "they permitted themselves to be the nucleus around which the idle, vicious and criminal element could gather. Reinforced by these dark and disreputable allies, they destroyed property, stopped commerce, deranged the mails, burned great public buildings, broke up tracks, and thus paralyzed the natural circulation of the commonwealth." It is in the menace to the general interests of society involved in these disturbances that the real gravity of the situation with which this country is now called to deal exists. "The railroad system is to-day a supreme necessity to maintain life, furnish ready markets, and to bring about the enormous interchange of products which makes the country one. Stop it, and in ten days many parts of the country would near the starvation-point, and within a month there would be no hamlet in the vast territory drained by these channels but would feel to the core of its business the effects of the stoppage of the regular and usual circulation."

The enormous mechanical changes and progress of the past century have brought about a complete revolution, so gradual that, perhaps, it has not been generally apprehended, in the very condition of things in the United States. The water lines, which, at the date of the framing of the Constitution, were our important channels of internal commerce, have been almost superseded by the new iron highways. Upon these is borne a traffic so essentially national, so closely interwoven with the interests not only of our own but other countries, that it demands the most efficient and speedy protection against all unlawful interference. Grain and other agricultural products of Iowa, Minnesota and Illinois; the wool, wine and bullion of California, Nevada and Utah; the cotton and other products of Texas, Louisiana, Mississippi and Tennessee are largely carried over the railways to New York, Boston, Philadelphia, Baltimore and other Atlantic cities, much of it for transshipment to Europe; while in return the manufactures of New England and the Middle States, with our importations from the various countries of the world, the basis of our national customs revenue, reach by the same railways all parts of the great West and the South. Certainly this great inland commerce, both in tonnage and value, is of such vast proportions, and requires for its successful management such absolute and uninterrupted freedom of movement, that the public, to which the traffic belongs, is entitled to instant and effective protection against all violent interruption, in the first place from the proper local authorities and the State itself, and in addition thereto, when their force is found inadequate, as it has been found in so many cases during the recent troubles, from the government of the United States.

It is well known that the government uses the railway lines of the country, both as postal and military highways, in such form as its interests may require. The Constitution of the United States imposes upon the government the duty of thoroughly protecting inter-State commerce. When it is considered that the stock and bondholders of the various railway companies, whenever the interests of the government required it, paid taxes upon their coupons, their dividends and their gross receipts; that they promptly met every call made by the Federal authorities, and that the entire equipment of the various lines was often placed at the disposal of the government for the prompt movement of the national forces and their supplies, to the exclusion often of other and more profitable traffic, it would seem but a matter of equity that the government should insure such protection to these railways as would preserve their usefulness and keep them always in condition to render similar services when they may be required. But over and beyond such considerations as these, the absolute dependence of the whole community upon this great system of railways for almost its very existence as a civilized body, would seem to impose upon the Federal government in the last resort the supreme duty of preventing any lawless and violent interference with the regular and certain operation of every railway in the United States.

This insurrection, which extended through fourteen States, and in many cases successfully defied the local authorities, presents a state of facts almost as serious as that which prevailed at the outbreak of the civil war. Unless our own experience is to differ entirely from other countries—and it is not easy to see why it should, with the increasing population of our large cities and business centers, and the inevitable assemblage at such points of the vicious and evil-disposed—the late troubles may be but the prelude to other manifestations of mob violence, with this added peril, that now, for the first time in American history, has an organized mob learned its power to terrorize the law-abiding citizens of great communities. With our recent experience before us, it is believed that no thoughtful man can argue in favor of delay by the proper authorities in dealing with lawless and riotous assemblages. Delay simply leads to destruction of property, and may lead in the end to the destruction of life. The force used to repress such assemblages should be as prompt in its manifestation as the evil with which it deals. The interests concerned are too grave to admit of delay. The raising of the black flag and the stoppage of all vessels on the great lakes and on the Mississippi and Ohio rivers would not produce one tithe of the damage to the whole country that has resulted from the recent stoppage of the great trunk lines. The burning of the vessels and their cargoes on these waters would raise a storm of wrath which no mob would dare to face, and would be visited by the United States government, under existing laws, with most exemplary punishment. But what distinction can be established between such a crime and the hideous destruction at Pittsburgh of over eighteen hundred cars laden with the products of the various States, together with the engines ready to move them to their destination, and the station buildings and machine shops that were absolutely essential to their proper care and movement, and which with other like doings resulted in the stoppage of all commerce and business relations between the States, not only on one highway but on many important lines, through the concerted action of the mob and its leaders? In the city of Pittsburgh much human life and many private dwellings and other property were sacrificed as the result of mob violence; indeed, it is almost a marvel that a large portion of that city was not destroyed by fire. Only the prevailing direction of the wind averted greater and and more general disaster.

The authority of the United States, now potent to protect commerce moving upon the waters, should be equally potent when the same commerce is exposed to greater peril upon land. This brings us, then, to the practical question: In what shape can this protection be put so as to be extended most efficiently and with the least delay? The present regulations all favor, unintentionally, the rioters and the mob. In the first place the mayor of a city must exhaust his power; the sheriff of the county must essay his strength; then, while precious time is expending—for a mob constantly attracts dangerous elements and grows with impunity and success—the governor of the State must be called upon by the sheriff of a county. If the State happens to have an effective military organization, which at the present time is the case in perhaps not more than five out of the thirty-seven States of the Union, the governor can call out the military forces and suppress the riot. If the State has no such organization, or if the military forces of the State prove inadequate to the emergency, the governor is paralyzed and must call upon the United States for assistance. If the authorities of any State should, for any cause, fail or refuse to call upon the United States government, what possible remedy or protection is left to life and property within the limits of that commonwealth?

It can readily be seen what frightful possibilities of mischief are afforded by the necessarily long interval which must elapse in the present state of our laws before the Federal authority can intervene in cases where its intervention is most imperative. In fact, as our recent experience has shown, the only roads which could procure prompt protection and immunity from interference were those whose misfortunes had made them bankrupt and placed them in the direct custody of receivers appointed by United States courts. To the aid of these roads the United States Marshal could call United States troops, and no rioter dared to resist the power represented by the small but admirably disciplined detatchments quartered near the scenes of the recent troubles. It will hardly be contended that the railway companies must become bankrupt in order to make secure the uninterrupted movement of trade over their lines, or to entitle them to the efficient protection of the United States government. If a bondholder or other creditor is entitled to the protection of the Federal courts to prevent the threatened impairment of the value of a property through legal proceedings, he certainly should not be left without remedy against lawless violence which has actually destroyed the security for his investment, and has, as at Pittsburgh, converted millions of dollars into scrap-iron and ashes. The laws which give the Federal courts the summary process of injunction to restrain so comparatively trifling a wrong as an infringement of a patent-right certainly must have been intended or ought to give the United States authority to prevent a wrong-doing which not only destroys a particular road, but also paralyzes the entire commerce of the country and wastes the national wealth.

It is demonstrable that during the recent disturbances the government of the United States was itself a direct loser, and, through the government, the taxpayers of the whole country, to a very large amount by the diminution of the national revenues arising from the interruption of business and the interference with many of the operations on which the internal taxes of the country are levied, as well as by the diminution of the customs revenues; as all the imports during this period, instead of being forwarded to their destinations, were necessarily placed in store, of course without payment of any duty to the government for the time being. Suppose that this state of things had continued for sixty days, would not the United States government have been deprived of nearly all the revenues on which it relies to meet its current obligations?

Certainly it cannot have been contemplated in the formation of our government that the United States authorities should submit to see the transportation of the mails, covering the enormous financial and business transactions of the whole country, and the movement of the supplies required for its own various departments, made dependent upon the grace and favor of rioters, whose misconduct in almost any other form would have secured their immediate arrest and condign punishment. During the recent riots the movement of United States troops was impeded at several points, and large quantities of ammunition and other Federal stores, on their way to the Pacific coast, were forcibly detained for days. The operations of the national government in some parts of the country were as completely blocked as in the early days of the civil war. There certainly should be a protection against such dangers and a remedy for such wrongs. If the government of the United States is to exercise its power of protection or of remedy, it perhaps can do so only through an adequate exhibition of the military force that may be given for such purposes by Congress. The important question is to ascertain in what way the government can so exhibit its military force as to secure the utmost possible efficiency in the enforcement of law and order without jarring or disturbing the general framework of our institutions and our laws. It seems to be indispensable, in the light of recent events, that whatever force is to be used by the government in such emergencies should be so distributed and controlled that it may be concentrated upon any point or points that may be threatened within a few hours of any outbreak. Several companies of regular troops that were quartered at Baltimore, Philadelphia, Pittsburgh, Reading, Scranton, Louisville, Chicago, and other places, during the recent riots, had to be transported for such distances that, if they had been compelled to march instead of moving by rail, they would have been powerless to avert mischief. It was only by the fear or favor of the rioters that the United States were able to concentrate their forces where they did. In some cases formal resolutions were passed by the strikers that no troops should be allowed to pass over the lines. In Jersey City a mob endeavored to prevent the departure of a United States battery and the troops connected therewith. On the Erie Railway, between Cornell and Hornellsville, a few lawless men, by tearing up tracks, destroying bridges, and tampering with switches, were able seriously to retard the millitary forces of the State, which were there under the orders of the governor to re-establish law and order. What is needed, therefore, would clearly seem to be that proper forces should be so disposed at prominent points, large cities and other great business centers—in many of which the government has arsenals, custom-houses, mints, navy-yards, and other property of its own to protect—that their movements can be combined rapidly, and they be directed against points of danger so as to be able to act effectively and with decision before violence can become triumphant.

With the experience of other countries to warn and guide us, and especially with the experience of England, where the rights of the people have for ages been guarded and asserted as jealously as they always have been and should be among ourselves, we shall have only ourselves to blame if through apathy, demagoguism or weakness we leave ourselves unprepared to meet an issue which from all the evidences of the times is only too likely again to be forced upon us. With the approach of winter, and the loss of outdoor employment which severe weather in the most prosperous times entails, the country will have to deal not only with the deserving among the unemployed, who can be reached and helped through local organizations, but with vast numbers of idle, dangerous, and in many cases desperate men, who have been allowed unfortunately to catch a glimpse of their possible power for mischief. Such men, unless confronted by a thorough organization in the cities, States, and other communities, backed by the power of the Federal government and an unmistakable public opinion, will need but little urging to renew the scenes which have already brought such disgrace upon the American name

It surely may be hoped that at the ap-

[*Continued on page 20.*]

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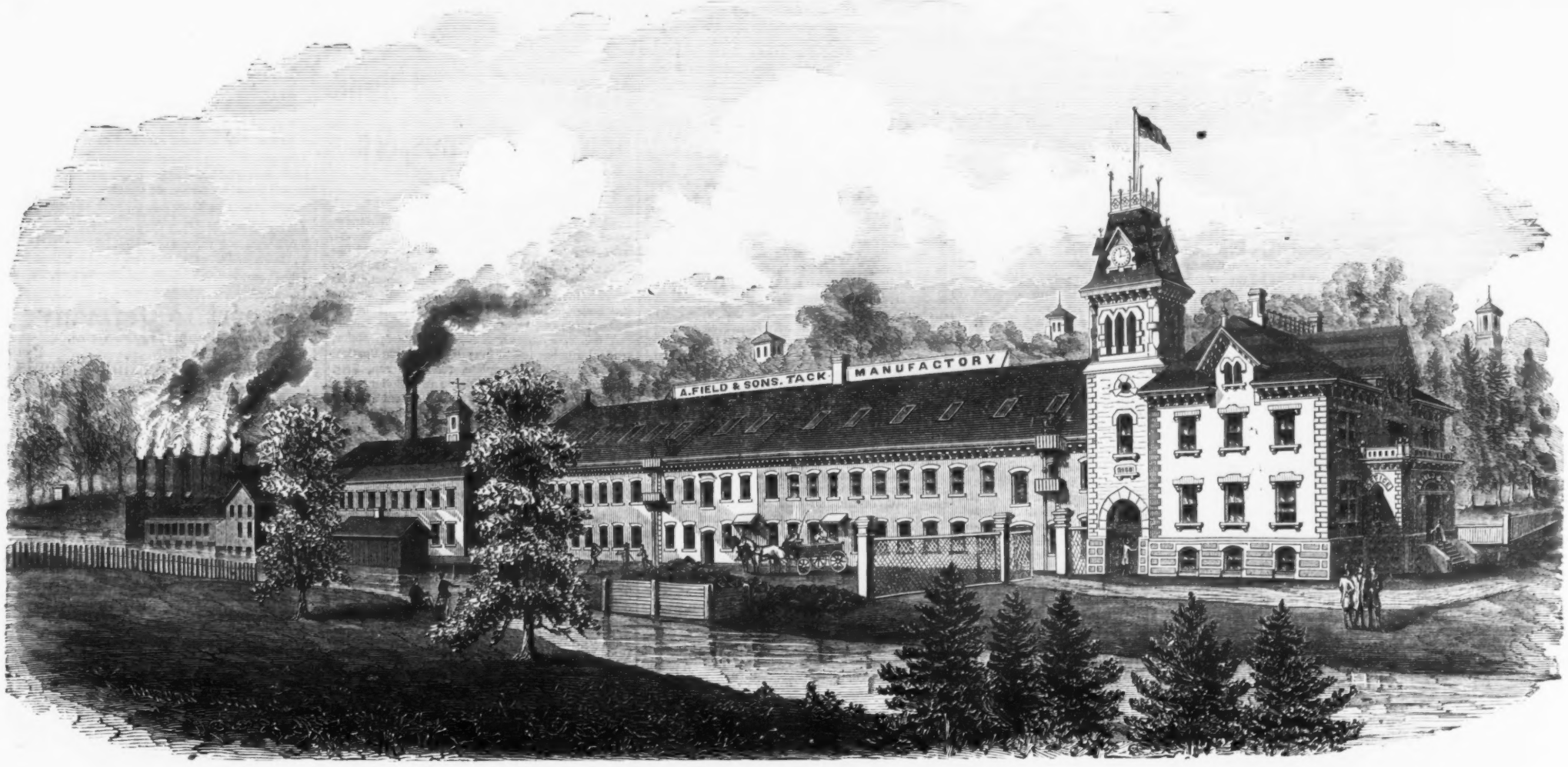

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[*Continued from page 18.*]

Col. Thomas A. Scott on the Railroad Strikes.

proaching session of Congress, the earnest, unprejudiced, and patriotic men of both houses will discuss this grave subject independently of party lines, and with the united resolve to secure equity to all interests and to take all necessary measures to secure protection to life and property and the impartial enforcement of the laws, including the guaranty to every man of the right to work for such compensation as he may agree upon with other men, free from interference or intimidation. The able lawyers of the Senate and House will perhaps frame a law which will give to the owners of every highway carrying inter-State commerce, whether by land or water, in which citizens of different States are interested, or carrying the United States mails or other government property, the right to appear by petition properly verified before the tribunals of the United States in order to show that the movement of such traffic has been interfered with by unlawful combinations, by threats, or by violence, and which upon such showing will give these tribunals the right, when necessary, to call upon the United States in the form now authorized by law to enforce their process by arresting the rioters and the suppression of all such unlawful combinations.

The magnitude of the evil to be met and dealt with can hardly be overstated. The remedy to be provided should be equally prompt and effective. It must be discussed and adopted in the interest of the whole country, and not of any particular class; for the interests of all classes of our citizens are the same in the maintenance of domestic peace and civil order.

But to no one class in the community is an absolute assurance of peace so important as to the men who have no capital but their labor. When the accumulations of labor are put in peril by lawlessness, capital may always protect itself by suspending the enterprises which give labor its value and insure it its reward. Anarchy not only deprives the laboring man of his present subsistence, but puts in jeopardy all his hopes of improvement for his own future and the future of his family.

My own railway experience, extending over a period of thirty years, leads me to believe that the managers of American railways in general may fearlessly appeal to their past relations with the faithful among their employes, to prove that they at least have always endeavored to treat the interests of employers and employed as identical, and have never failed to take into prompt and respectful consideration every grievance which has been fairly and properly presented to them. I am sure that it has been the purpose of the company with which I am connected to at all times pay its employes the best compensation that the business of the country would warrant; and I have no doubt that this will be the policy of the company for all future time, as it is founded on sound business principles no less than upon the instincts of humanity.

Very truly yours,
THOMAS A. SCOTT.

The Industrial Decadence of Germany.

The British *Trade Journal* says: In a recently issued report on the trade of Dantzic, Vice Consul Kruge throws some light on the decline of German commerce and industry. He writes: The complete failure of the German manufacturing enterprise inaugurated on an extensive, reckless scale all over the German Empire since the close of the Franco-German war, with an increase of taxes, enhanced cost of living, absence of lucrative employment for small artisans, a distress among small tradesmen and agriculturists, and want of labor for workingmen in nearly all large towns, have caused a general discontent among all those people who are more or less dependent on earning their daily bread by hard work and continual struggles.

The result of the last elections for the German Reichstag, and particularly the large minorities in favor of candidates representing the discontented section of the German people, have given the most glaring example that there is a movement growing such as has not been witnessed since the year 1848. The great distress prevailing in the mining and manufacturing districts and others, but especially in Silesia, Rhineland and Westphalia, and the utmost exertions made by manufacturers for a Protective tariff at the present time, show very clearly that the prospect of exporting German manufactured goods extensively at remunerative prices has become a poor one, or at least one that cannot be relied upon in future.

In former times German industry was able to compete successfully at least in what may be called cheap goods with that of other countries, because she had the advantage of cheap and good labor. This advantage has been entirely lost since the last war; as wages rose labor became worse, and the quality of most German goods declined even more. At the time when French commerce and industry had received a severe blow through the siege of Paris and all the consequences of a disastrous war, Germany had an opportunity without comparison to open new markets and to extend the field of mercantile operations abroad, greatly to the advantage of her manufacturing interest, especially as fortune favored her industry as much as it had blessed her arms. Immediately after the war German manufactories were completely overwhelmed with orders (this was an opportunity not to be lost sight of), but instead of trying, regardless of profit, to secure all such new customers by delivering only unquestionable quality of articles, which would have given a proof that Germany had been underrated in her taste and manufacturing powers, the great majority of manufacturers could not abandon their short-sighted policy (a German peculiarity) for the sake of a momentary profit, and the natural consequence took place, viz., German goods got in worse repute at home and abroad, and the new markets were lost. The very fact that numerous articles are imported from England and France into Germany of a better quality than those manufactured in the latter country at similar, or in many cases, even at lower prices, notwithstanding the extra expenses for freight, insurance, duty, &c., indicates a serious decline in the native German industry. The poor figure German industry cut at the Philadelphia Exhibition furnished, likewise, a striking proof that there is plenty of room for improvement, moreover as the United States have, during the last twenty years, been looked upon by German manufacturers as offering the largest field for their articles.

Tungsten Bronze.

Shule having analyzed in 1781 a mineral known under the name of Tungsten, concluded from his researches that it was formed from lime and an acid; Bergman regarded the acid as being of a metallic nature; but this opinion was rectified some time afterward by the brothers d'Elhyart. The discovery of this metal, therefore, belongs to them, although it had been foreshadowed by the Swedish chemist.

Tungsten or wolfram, which is now frequently found in tin mines, is solid, very hard, very heavy, and can hardly be cut with the file. It is brittle, and has a certain metallic luster. Its specific gravity is 17.6. In a contribution to *La Metallurgie*, Mr. Alex. Majeon produces bronze and brass out of a composition of copper, zinc, lead and tin, to which he adds a certain quantity of tungsten, which has essentially the property of fluxing these métals and giving to them special properties. These compositions, according to the proportions of the elements which enter into their composition, possess ductility, malleability, sonorousness, and conductivity of electricity. From these ingredients Mr. Majeon obtains a bronze and brass at smaller cost than by the usual methods. Certain of these alloys have such tints that they can be used as an imitation of gold and silver. In other cases, according to their density, they can be used as bell metal, machine dies, type, &c.

Hitherto tungsten has only been used in the arts to harden the iron and form a special steel.

The principal applications of this new alloy are as follows: Bronze for dies and pieces of mechanism; brass for rolling, drawing and chasing; metal for bells, electrical clock works, &c.; bronze for ornaments; strings on pianos and other musical instruments, types, &c.

Portable Electric Light.—An ingenious little electric light apparatus has been invented by a Mr. Facio, of Paris, and is applicable to watches, walking sticks and such like. The watch, for instance, to which it is applied is united by a chain to a link bar, which may be placed in a buttonhole; another chain communicates with a pile which may be carried in the waistcoat pocket; to the link bar another chain is attached in communication with a receptacle or box containing wick, and a "Geissler" tube, which will transmit the spark produced by the electricity. Thus the time can be seen in the dark. The apparatus is composed of other conducting chains coming from the pile, and of a receiver which may be perfectly independent, provided with a wick or bobbin, and made like a locket or other article if desired; communication between pile and locket or other article may be produced by means of a button or other suitable appliance placed in any convenient position. The chains may be formed or composed of two wires and surrounded by insulating material, which latter may be covered with some precious metal or other material, as fancy or taste may dictate. The lighting material may be carried by the watch itself, or the light generating apparatus may be provided with a case to hold the watch or other object to be lighted up in such a manner that the glass which covers the aforesaid case will receive the action of the lighting tube containing the "Geissler" tube, and the case itself will be independent of the object to be lighted.

The mechanical machinery at the Bank of England is marvellously perfect. It may not be generally known that the London bankers, when the standard weight of the working sovereigns is suspected, send these into the Bank of England, the suspected coins being kept separate and weighed one by one, and the light sovereigns charged to the debit of the banking house that delivered them. To large concerns like Glyn's, the London and Westminster, Barclay's and the National Provincial, the debit account for light gold tots up at the end of the year to a large amount. The deficiency in the weight is caused by abrasion in the constant wear and fingering of the gold currency. The machines which weigh the sovereigns are numerous—about twelve or fourteen. They are driven by an air engine, and are fed through long tubes placed in an inclined position over the machines, and one by one these clever machines weigh them, and, like stern sentinels, pass the honest sovereign to the right hand, but without ceremony kick the light one, which is found wanting, into another basket. These machines are beautiful. Their perfect automatic action excites admiration. The sovereigns which pass this infallible and equally inflexible judge are put into bags and have the honor of again asserting their honest value in the busy world. With regard to those which have been placed in this beautiful balance and found wanting, they are cut to pieces and afterward cast into a burning fiery furnace at the mint, and there regenerated in full weight and measure, made bright and beautiful, and impressed with the image of Queen Victoria.

The late singular disintegration of a mountain in Tarentaise, Savoy, somewhat like what is said to have taken place on a less violent and extensive scale in this country, has been investigated by M. Berard. He says that neither the melting of snow, the penetration of water, the movement of underlying strata, nor the steepness of the slope fully account for the occurrence; and he suggests the activity of some geological force which acts obliquely to the axis of the mountain and parallel to the sides. Large blocks of hard schist were from time to time severed with noise and violence from the main mass, and fell with destructive force to the lower-lying land. Showers of small stone followed the larger masses, causing a whistling sound in their course through the air. Between each disruption a short period of repose occurred, and then the destruction was resumed for a long time. The impact of one block of stone is said to have been so intense that it caused the branches and trunk of a tree to disappear like a burning match in the air.

A correspondent of the Oil City *Derric*, writing from St. Joe, Butler county, states: "About three-quarters of a mile south of town is the celebrated Delameter gas well, the roar of which, for a year after it was struck, could be heard for miles, and the light from which lighted up the surrounding country for a great distance. While a short distance from the well the snow and ice of a rigorous season covered everything, yet in the immediate vicinity of this wonderful roarer the grass grew luxuriantly and cattle enjoyed green pasture and a warm fire all winter long. This, and all other gas wells in the vicinity of any importance, have recently been purchased by the Butler Gas Company, and the gas utilized by being conveyed in five and five-eighth casing all over the country, to be used for light and fuel."

The city of Richmond, Va., has as much to be proud of in the way of "characteristic American enterprise" as many of the Western cities which make larger boasts. Twelve years ago Richmond, with 45,000 inhabitants, lay half in ruins. Now she has rebuilt the whole of the burned district, has established two hundred factories, and with a population of 75,000 people is one of the handsomest cities in the world.

The Virginia *Chronicle* says: "The recent advance in the price of quicksilver will increase the cost of milling silver ores by about $1 per ton, and the opinion of well-informed parties is that the price will go still higher. The average loss of quicksilver in working ores by the Washoe process is two pounds per ton."

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I am prepared to make arrangements with Eastern manufacturers to act as their agent for the sale of Hardware, etc., on the Pacific Coast.

REFERENCES:
Sargent & Co., 37 Chambers Street, New York.
VanWagoner & Williams, 82 Beekman St., N. Y.
T. Hessenbruch & Co., 10 N. 5th St., Philadelphia.
The Pennsylvania Tack Works, Norristown, Pa.
The Pacific Bank, San Francisco.

Export to Germany

And Surrounding Countries.

Agency for Soliciting Patents

In the German Empire.

☞ See the new Patent Law published in full in *The Iron Age* of June 21, 1877.

Hammacher & Delius,

HAMBURG, GERMANY.
Dealers in exclusively
American Hardware, Agricultural Implements, House-Furnishing Goods, &c.
HOUSE IN NEW YORK,
A. HAMMACHER & CO.

Important to Manufacturers.

BISSELL, WELLES & MILLET,
Auctioneers and Commission Merchants, No. 15 Murray St., New York,
Solicit from Manufacturers and others consignments of Hardware and Cutlery for our weekly Auction Sales to the Trade, or at private sale for cash, as desired. Our facilities for moving large lines of goods are unsurpassed. Advances made if desired.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address,
IRON AND STEEL,
Care of *P. O. Box 813, Bridgeport, Conn.*

LEHIGH UNIVERSITY.

TUITION FREE.

CIVIL, MECHANICAL and MINING ENGINEERING; CHEMISTRY and METALLURGY; FULL CLASSICAL INSTRUCTION; FRENCH and GERMAN; ENGLISH LITERATURE; INTERNATIONAL and CONSTITUTIONAL LAW; PSYCHOLOGY and CHRISTIAN EVIDENCES.
For Registers address
The Rev. John M. Leavitt, D. D., President,
Bethlehem, Pa.

NOTICE.

PHILADELPHIA, April 2, 1877.

On and after April 30th the Shipping Agency of **The Pennsylvania Warehousing and Safe Deposit Co.,** at Perth Amboy, New Jersey, will be discontinued.

B. K. JAMISON, Vice President.

WANTED.—Price Lists and Discounts of Hardware, Mechanics' Tools and House Furnishing Goods, by mail only.
ELLISON STACKHOUSE, Hardware Dealer,
1403 Ridge Ave., Philadelphia.

DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of
Iron and Steel Drop Forgings
in quantities to order at reasonable rates.
HERMANN BOKER & CO, Proprietors, 101 & 103 Duane St., N. Y.

SCHMIDT & ELBERS,

BREMEN, GERMANY.
Dealers Exclusively in American Hardware.
Manufacturers who wish to have their goods introduced in Germany, please correspond.

TO LET,

A Light, Handsome Office.

Possession Immediately.
HERMANN BOKER & CO., 101 Duane Street, N. Y.

SPECIAL NOTICE.

I have three patents for Dies, Machinery and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1866, and July 3, 1866. **There is a special claim on each of the dies.** All persons infringing on said patents will be held responsible to the extent of the law. **Russell Jennings.**
DEEP RIVER, Conn., Sept. 7, 1874.

New & Second Hand Machinery & Tools

One 30 in.x6 ft. Pond planer; one 21 in.x6 ft. Ferriss & Miles, do.; three 16 in.x3 ft. Pratt & Whitney, do.; one 15 in.x3 ft. New Haven, do.; twelve Pratt & Whitney milling machines; two extra heavy milling machines; one double head, do., Wood, Light & Co., makers; three bolt cutters, Wm. Sellers & Co., makers; one heavy chucking lathe; one 14 in. Putnam Shaper; one 8 in. N. Y. S. E. Co., do.; one heavy shear, cuts 2½ in.x4 in. iron; one 700 lb. steam hammer; one 1200 lb. do.; six 16 in.x8 ft. lathes; six 14 in.x6 ft., do.; two heavy upright drills; two Merrill Drops, 600 and 1000 lbs. hammers; thirty spinning lathes, 12 in. swing, 4 and 5 ft. beds. Lot small engines and other machinery.

The Bullard Machine Co., Limited,

14 Dey Street, New York.

For Sale.

The stock, lease and good will of an old established Hardware and Stove Business situated in a thriving village in Western New York.

Address *MONROE,*
Office of *The Iron Age*, 83 Reade St., N. Y.

INVENTIONS.

Responsible parties wishing to reduce inventions to practice can find just the opportunity they require, as regards low cost, first-class mechanical skill and facilities, combined with practical knowledge and successful experience in this line, by applying to the
ATWOOD MACHINE CO.,
Stonington, Conn.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Sept. 5, 1877.

From nearly all the important branches of wholesale trade we have reports of encouraging improvement and the promise of a more satisfactory business during the remainder of the year than has been done for some years past. The large crops and the certainty of a foreign demand for our surplus at good prices, encourages dealers in the agricultural districts to purchase more liberally than at any time since the panic, and a larger quantity of goods are going into consumption than could have been distributed under any other conditions. Prices are still very low and profits small, but the opinion in business circles is that we are experiencing the beginnings of a satisfactory and sustained recovery of moderate industrial and commercial activity.

In the financial markets the event of principal interest since our last report was the decline of gold to 103¼—the lowest point reached since the 20th of May, 1862. The money market has been somewhat more active than for several months past. Call loans have been quoted as high as 7 per cent., prime business paper at 5½ @ 7 per cent.

The gold market has been fairly steady between 103⅜ and 104⅜. The notable feature in the decline to the lowest point reached is that it occurred just after the Bank of England had advanced its discount rate 1 per cent., and arrested for the time the flow of gold here from London, and indirectly caused United States bonds to be sent here in place of gold. Such, however, is the present and prospective supply of bills against Western and Southern exportable products which Europe must have that gold continues weak, and the indications are that, making allowance for the return of a considerable amount of securities from Europe, we shall before December import a large amount of gold. The following table shows the daily range of the premium :

	Highest.	Lowest.
Thursday	104¾	104⅛
Friday	104	104
Saturday	104	103⅞
Monday	103⅞	103⅜
Tuesday	103⅝	103⅜
Wednesday	103⅜	103¼

Government bonds declined with gold during the week, closing as quoted below. State bonds are dull and steady. Railroad bonds are strong and generally higher.

The stock market has been quite strong, with a marked improvement in the whole list, especially the coal stocks. The principal dealings have been in Western Union, Lake Shore, Delaware, Lackawanna and Western, Michigan Central, and New York Central.

The unfavorable feature of the weekly statement of the New York banks is the large loss in legal-tender notes, which, of course, is due to currency shipments to facilitate the transfer of the crops from first to second hands. So far as the surplus reserve is concerned, this loss has been nearly overcome by the increase in specie and the reduction in general deposit liabilities, the surplus reserve now being $11,798,025, or only $6600 less than a week ago. The following is a comparison of the averages for the past two weeks :

	Aug. 25.	Sept. 1.	Differences.
Loans	$244,899,600	$243,778,700	Dec. $1,120,900
Specie	14,259,000	16,030,100	Inc. 1,771,100
Legal t'nd'rs	50,789,000	48,130,600	Dec. 2,658,400
Deposits	213,026,300	209,450,700	Dec. 3,575,600
Circulation	15,515,100	15,383,300	Dec. 131,800

The following tables show the foreign trade movements for the week :

FOREIGN IMPORTS.

For week ended Sept. 1 :

	1875.	1876.	1877.
Total for week.	$5,770,713	$4,467,011	$6,046,094
Prev. reported.	235,707,013	195,418,893	221,342,417
Since Jan. 1	$241,477,726	$199,885,904	$227,388,511

Included in the imports of general merchandise were articles valued as follows :

	Quantity.	Value.
Anvils	67	$561
Brass goods	13	2,459
Bronzes	12	1,271
Chains and Anchors	12	350
Cutlery	94	27,574
Guns	15	2,901
Hardware	9	1,204
Iron, pig, tons	200	3,043
Iron, sheet, tons	15	1,610
Iron ore, tons	300	574
Iron, other, tons	1,770	56,268
Lead, pigs	7,886	45,610
Metal goods	170	20,292
Needles	18	4,045
Nickel	8	3,584
Old metal		506
Platina	2	4,728
Per. caps	35	6,208
Saddlery	1	356
Steel	738	12,612
Silverware	7	300
Tin, bxs	33,035	168,166
Tin, 3,359 slabs	274,622	41,206
Wire	17	9,046
Zinc	22,046	1,113

EXPORTS, EXCLUSIVE OF SPECIE.

For week ended Sept. 4 :

	1875.	1876.	1877.
For the week	$6,346,163	$6,417,217	$7,201,045
Prev. reported.	167,379,456	175,312,882	182,483,319
Since Jan. 1	$173,725,621	$181,730,099	$189,744,364

EXPORTS OF SPECIE

For week ended Sept. 1 :

Total for the week	$70,606
Previously reported	21,947,521
Total since Jan. 1, 1877	$22,018,127
Same time in 1876	39,677,722
Same time in 1875	64,130,429
Same time in 1874	40,717,171
Same time in 1873	34,974,762
Same time in 1872	56,542,170

Government bonds at the close were quoted as follows :

	Bid.	Asked.
U. S. Currency 6's	122¾	123¼
U. S. 6's 1881 registered	109⅜	109½
U. S. 6's 1881 coupon	110⅜	110⅝
U. S. 6's 1865 new reg	105⅛	105⅜
U. S. 6's 1865 cou	105½	105⅝
U. S. 6's 1867 reg	107½	107⅝
U. S. 6's 1867 cou	107⅛	107⅜
U. S. 6's 1868 reg	109⅛	109⅜
U. S. 6's 1868 cou	109⅛	109⅜
U. S. 10-40 reg	107¼	108
U. S. 10-40 coupon	108⅞	109¼
U. S. 5s 1881 registered	107⅞	107⅞
U. S. 5s 1881 coupon	107¼	108
U. S. 4½s 1891 registered	105⅞	106
U. S. 4½s 1891 coupon	105⅞	106
U. S. 4s 1907 registered	102¼	102½

Following were the closing quotations of active shares :

	Bid.	Asked.
Atlantic and Pacific Telegraph	19	20
Chicago and Northwest	33½	33¾
" " Pref	63	63⅛
Chicago, Rock Island and Pacific	100⅞	101⅛
Chicago, Bur. and Quincy	100¾	101
Col., Chic. and Ind. Cent	4⅞	4⅞
Clev., Col., Cin. and Ind	36	37
Cleveland and Pittsburgh	82	82½
Chicago and Alton	86	87
" " Pref	100	—
Consolidation Coal	21	—
Delaware, Lack. and Western	58¼	58⅜
Delaware and Hudson	56¼	57
Express—Adams	93½	94½
" American	48	49
" United States	45	46
" Wells, Fargo & Co	82	82½
Erie	12⅛	12¼
Harlem	142	143
Hannibal and St. Joseph	12¼	12½
" " Pref	28¼	28¾
Illinois Central	67¼	67½
Lake Shore	65	65¼
Michigan Central	58	58¼
Morris and Essex	81½	82
Milwaukee and St. Paul	32¼	32½
" " Pref	67½	67⅝
New York Central	103½	103⅝
New Jersey Central	18¼	18½
Ohio and Mississippi	7	7⅛
" " Pref	12	12¼
Pacific Mail	25⅛	25⅜
Panama	112	113
Pittsburgh and Fort Wayne	91	91¼
Quicksilver	18⅝	19
" Pref	32½	33½
St. Louis and Iron Mountain	6⅜	6⅞
St. Louis Kansas City Northern	4⅜	4⅝
" " Pref	24	24¼
Toledo, Wabash and Western	12¼	12⅞
Union Pacific	70⅜	70⅞
Western Union Telegraph	84	84⅛

MINING STOCKS.

Mr. Ogden Haight, No. 65 Wall street, sends us the following report of the business of the New York Mining Stock Exchange for the week ending Sept. 5 :

	Closing Quotations.	Shares Sold.
Alpha	12.87½	400
Belcher	6.62½	100
Bertha & Edith	1.30	17,000
Best & Belcher	21.12½	300
Bullion	8.50	300
Caledonia	4.37½	300
California	31.62½	1,95
Chollar Potosi	37.12½	500
Cleveland	6.12½	2,600
Consolidated Virginia	36.62½	200
Confidence	6.62½	500
Crown Point	4.62½	200
Eureka	47.25	150
Exchequer	7.75	400
Gould & Curry	10.75	1,050
Hale & Norcross	7.37½	500
Julia Consolidated	1.62½	600
Justice	16.25	....
Kentuck	6.37½	1,250
Lacrosse	.33	4,300
Leopard	1.87½	500
Mexican	11.50	800
Moose	5.37½	16,275
Northern Belle	20.37½	800
Ophir	19.00	500
Overman	28.87½	300
Raymond & Ely	17.00	....
Savage	8.75	1,200
Segregated Belcher	44.00	125
Sierra Nevada	5.00	600
Silver Hill	3.25	100
Union Consolidated of Tenn	15.50	500
Yellow Jacket	11.87½	1,400

Most of our transactions during the past week were in Moose, and Bertha and Edith, comprising over 16,000 shares of both of them. The former stock rose from 5¼ to 5½ in the beginning of the week, declining to 5⅛ on Monday, and closing at 5⅜. The latter has advanced to $1.30 per share, with more activity at the close. The Moose Company announces the payment of a quarterly dividend of 25c. per share on its stoke on the 15th instant, at its office, No. 57 Broadway. Lacrosse opened at 33c., advanced one point and dropped to 33c again. The sales of this stock were but 4300 shares. The Ontario Company has declared its usual monthly dividend of 50c., gold, per share, payable at the office of Wells, Fargo & Co., 65 Broadway, on the 15th instant, also an extra dividend of same amount, payable at same time and place.

We chronicle also announcements of payment of monthly dividends of 1 per cent., on the part of the Hukill Gold and Silver Mining Company of Colorado, and of the Merrimac Silver Mining Company of Boston, Mass.

GENERAL HARDWARE.

The fall trade may now be said to have fairly, and as far as the volume of business is concerned, satisfactorily opened. Our city houses are as a rule fully employed, and the only complaints we hear of are the well-grounded ones concerning the demoralization which exists in the prices of some important lines of goods. There are very few changes to note in values, and the month has opened without any important developments. Sargent & Co. have just issued their discount sheet, No. 2, to apply to their 1877 catalogue, to which is added a condensed list of Mallory, Wheeler & Co.'s Locks. The changes in prices which have been made since their last discount sheet was published were noticed in these columns at the time of their occurrence.

The price of Brass Butts is somewhat irregular, and we quote these goods discount 55 and 10 to 60 and 10 per cent.

The demand for Nails is fair and stocks in the hands of several of the manufacturers here are badly broken. The recently adopted card, viz., $2.50 for 10d., subject to a discount of 10 cents per keg where 200 kegs are taken in one month, is strictly adhered to. The market is decidedly firm, and there is no disposition to book orders for future delivery at present rates.

We have received the following circular, which fully explains itself :

TO THE HARDWARE TRADE.

PHILADELPHIA, September 1, 1877.

Having made great improvements, and invented and patented labor-saving machinery, we are now prepared to offer a much better Sad-Iron than those heretofore made. We therefore notify you that from this date our prices, on Sad-Irons only, will be reduced from 20 to 40 per cent. discount from Catalogue prices.

The list price on Nos. 100 and 105 is increased to $5.50 and $4.00 respectively, discount as above.

All parties who have Irons on hand of our make, purchased since July 1st, upon sending us a memorandum of the same, will have their accounts credited with the difference as above. Should a further decline be made at any time by us, we shall protect our trade in the same manner.

We desire it to be borne in mind that we own the original patent for and are the only manufacturers putting non-conducting fire cement in Irons, thus giving them the qualities of heating quicker and retaining the same longer, and also of preventing the heat from arising to the hand.

We also desire that hereafter the "Mrs. Potts' Patent Iron" of our make shall be called "Mrs. Potts' Enterprise" No. 50 or No. 55, &c., as the case may be.

Believing that the above reduction in prices will be for our mutual benefit, we remain, Yours, very truly,

ENTERPRISE MANUF'G CO. PHILA.

Graham & Haines have been appointed sole agents for Marvin's Patent Cash Drawers. They are made in two styles, with and without knob, and are quoted at $27 and $30 per dozen respectively. The manufacturers claim this to be the best constructed Cash Drawer in the market; it has no springs to get out of order.

The Providence Tool Co. have issued a circular, illustrating Pearson's Patent Adjustable Screw Clamp, in which they say : "We have been selling the Pearson Adjustable Clamp for several years, and find it to be entirely practical and durable, giving universal satisfaction. We have now made arrangements to manufacture the Clamps ourselves, and shall offer them for sale at very much reduced rates. The present cost of manufacture is scarcely more than that of the common clamp, therefore we propose selling them at about the same prices." Henry B. Newhall, No. 11 Warren street, is their agent in this city.

On another page we print an article illustrating an improved Sausage Stuffer and Family Press manufactured by Silver & Deming Mfg. Co., Salem, Ohio. They have issued the following discount sheet, under date of August 1, 1877, for these and kindred goods :

	Dis. per cent.
Hand Meat Choppers	25
Power "	20
Horse-Powers	20
Sausage Stuffers	25
Family Sausage Stuffers	25

We have received from the Cowles Hardware Co., of Unionville, Conn., a copy of their illustrated catalogue and price list issued under date of July 1, 1877. In addition to the large assortment of House-Furnishing Hardware, &c., presented in their former catalogue, they illustrate the Hercules Door Spring and Retainer, Air Cushion Door Spring and Double and Single Spring Butts. Among their regular goods they show a good line of Screw Drivers, Cast Steel Mincing Knives, Tack Hammers, Carpet Stretchers, Box Scrapers, Ice Picks, Corkscrews, Cleavers, Bill Hooks, &c., &c.

We invite the attention of the trade to the advertisement of Newlin & Yardley, Philadelphia, Pa, on page 26, in which they enumerate a large variety of goods, which they quote at very low prices for prompt cash.

BRITISH IRON MARKET.

(Specially reported by cable for The Iron Age.)

WEDNESDAY, Sept. 5, 1877.

Scotch Pig.—Since last Wednesday prices have fluctuated in both directions, but the market is now steady and there is a good business doing.

Manufactured Iron.—Under weaker prices there is an improvement in the demand, though transactions are small. Best Staffordshire bars are quoted at £7. 10/ to £8. 10/.

Rails.—There is a large demand for Rails for India, and the transactions have been heavy. Welsh are quoted £4. 15/ to £5.

IRON.

American Pig.—There is a fair jobbing demand reported, without any large individual transactions. Several hundred tons of North River Iron has been sold during the week at a very low price, said to be on the basis of $17 for No. 1. This action has had rather a demoralizing effect on the market, but so far as we can learn the Lehigh companies continue firm in their views at our quotations, and we continue to quote : Foundry No. 1, $18 @ $19; Foundry No. 2, $17 @ $18; Gray Forge, $16 @ $17.

Scotch Pig.—From recent mail advices from Scotland we learn that the total number of furnaces in blast in that country for the week ending August 25, 1877, was 87 against 115 for the corresponding week in 1876. Notwithstanding this greatly diminished production the warrants in store, August, 1877, show 155,842 tons against 80,535 tons at the same time last year. During the week 100 tons Glengarnock to arrive, and 50 tons Eglinton on the spot, were sold on private terms. The market is a firm one at our quotations, but as regards demand it is dull and apathetic. We quote Glengarnock $25 @ $25.50 ; Eglinton, $24 @ $24.50, and Coltness, $26.50 @ $27.00.

Rails.—We have no transactions to report, and repeat quotations, viz., Iron, $33 @ $38, and Steel, $45 @ $47, both at mill.

Old Rails.—We quote $19 as the nominal price.

Scrap.—In the absence of business we repeat our quotation of $23 @ $24 for No. 1 Wrought, from yard.

Manufactured Iron.—The demand for Bars continues light and unsatisfactory, the very low price now ruling seeming rather to deter than to stimulate transactions. Common Iron is quoted in this market at 1.75c. and Refined at 2c. Norway Nail Rods are quoted in a small way at 6c. We learn of a very considerable reduction in the price of Solid Wrought Iron Beams, which are quoted at 2.6c. by A. R. Whitney & Bro. for large lots. In this connection we would mention that a contract was closed yesterday for the erection of a large linseed oil factory in Brooklyn. The building is to be fire-proof, and it is computed will require about 1000 tons of Iron. We are informed that the contract for Wrought Iron Beams for this building was taken at the above-mentioned price.

METALS.

Copper.—Sales for the week sum up some 350,000 pounds Lake Superior at 17⅞c., 18c. being generally demanded toward the close. Baltimore continues to be held out of the market. There is now rather more strength becoming manifest; the cheap lots have been either taken up or withdrawn, and as the mining companies have for the moment ceased to be sellers at present rates, even a slight demand would, in our belief, suffice to impart a decidedly upward turn to prices. It can nevertheless not be denied that there is a surplus of Copper, which will either have to be exported, now or later on, or be carried by somebody. As for the mining companies, some of them are supposed to be financially not in a position to carry their surplus, and are thus compelled to part with it when they have got it ready for sale. The manufacturers, on the other hand, have for some time past adhered to the policy of not anticipating requirements beyond a month or so at the utmost. Speculation there is apparently none left, and in view of the gradual decline in Copper in Europe, at least so far as Chili Bars are concerned, the metal here has lacked the support/it has always met with in former years whenever a notable depreciation took place. According to advices per cable from London, Best Selected remains steady at £75, while Chili Bars have given way £1, declining to £67. 10/, a very low figure. Manufacturers of Brass of the lighter sort, we are informed, have been moving off more readily during the past four weeks, while heavy goods are dull. Manufacturers could, we believe, easily stimulate the demand for their wares by making a reasonable reduction, somewhat in conformity with the decline in Ingot Copper. Instead of doing so they exact the old rates, which we repeat : New Sheathing Copper, 28c., and Bolts and Braziers, 30c. ; Yellow Metal Sheathing, 20c. ; English do., 16½c. ; Yellow Metal Bolts, 25c.; and Nails, 20c., net cash.

Tin.—Our market remains in a weak condition, some Malacca having changed hands at 15c., gold. We quote large lines as follows : Straits, 15c. @ 15⅛c. ; Australian, 15c. ; English Refined, 15c. @ 15⅛c. ; Common ditto, 14¾c. ; and Banca, 17½c., all gold. Sales are small. The London market, as per cable, has fluctuated between £64. 10/ and £65. 10/ for Straits, closing at £65. L. and F. is cabled £68. 10/. Singapore cables $19.50 per picul, with an exchange of 3/11. The telegraph furthermore informs us that the stock at London on the 1st instant was 10,000 tons, and that the August deliveries in England and Holland were 1700 tons. *Tin Plates.*—The demand is an exceedingly light one. We quote, gold, per box, large lots, ordinary brands, as follows : Charcoal Bright, $6.62½ ; ditto Ternes, $6.12½ ; Coke Tin, $5.70 @ $5.80 ; and ditto Ternes, $5.50 @ $5.62½, all gold. They report by mail from London, under date of 25th ultimo : "Some of the makers are better off for orders, and prices are a shade firmer."

Lead.—Athough the demand for shot has been quite fair last month and since, this has led to no improved inquiry for the raw material, manufacturers still holding an ample supply thereof. The market has thus retained its dragging character, and sales have been confined to a lot of 50 tons, at 4.90c., currency. The freight for 150 tons engaged for England, at 25/ per ton, has, we presume, reference to Mexican bullion (argentiferous Lead) in transit, for at present low prices in Europe we cannot yet ship domestic Lead without loss. We have not yet reached the export point, but as we said in our last report, the day may not be remote when we shall get there through sheer overproduction. Manufactured Lead is lower, in sympathy with the recent decline in Pig ; we now quote Bar 7c., Pipe 7½c., Sheet 8c., and Tin lined Lead Pipe 15c., all less 10 per cent. to the trade. Under date of August 25, they report from London : "The market has exhibited further weakness, and prices have fallen about 2/6 per ton for English, and for Spanish about 5/ per ton."

Spelter and Zinc.—Of Common Domestic Spelter some 50 tons sold at 6.30c., currency, delivered East, equal to 6.20c., currency here. The article is scarce, and now worth 6c. @ 6⅜c., currency, according to brand. Should a more active demand spring up than is as yet observable, the price would in all probability be susceptible of a more marked advance. Refined, we quote 8½c. @ 9c., currency. Of Foreign there is none to speak of here, nor any on the way that we know of, and we quote the same nominally, 6c. @ 6¼c., gold. By mail from London, Aug. 25, we have the following : "No change reported, but prices are easy, and Zinc is also rather lower." Sheet Zinc is without alteration ; Mosselman, 8c. @ 8½c., gold, and Domestic, 7⅜c. @ 7½c., currency.

Nickel.—Is steady. German is moving off in moderate quantities at $1.70, gold. We quote the entire range, $1.70 @ $1.90., gold.

Antimony.—There seems to be a great scarcity of ore just at present in England, and makers in consequence thereof decline to enter upon further contracts for the sale of the metal. The price there is gradually working upward, despite the moderate demand, the supply being within easy control. We quote the market, 11½c. @ 12c., gold.

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending Sept. 4, 1877 :

	Quan.	Value.
Hamburg.		
Hdw., bxs.	79	$3,082
Belting, pkgs.	4	1,084
Steel, cs.	4	354
Sew. mach., cs	216	5,422
Cr'ge mtl., pgs	52	500
Mach'y, pkgs.	14	1,450
Mf. iron, pkgs	434	935
Clocks, bxs.	11	289
Ag. Imp., pgs.	6	555
Bremen.		
Hdw., cs.	4	202
Pl't'd ware, cs.	2	150
Mf. iron, pkgs.	28	1,270
Wheels,	16	100
Ag. imp., cs.	4	330
Rotterdam.		
Pumps, pkgs.	13	1,092
Hdw., cs.	26	990
Ag. imp., pkgs	46	522
Bristol.		
Clocks, bxs.	6	78
Clocks, pkgs.	78	1,245
Liverpool.		
Pistols, bxs.	2	700
Hdw., cs.	124	3,214
Clocks, bxs.	44	803
Cutlery, cs.	2	75
Sew. mach., cs	8	800
Mach'y, pkgs.	14	1,555
Ag. imp.	111	1,200
Air guns, cs	1	400
L'p goods, cs.	32	1,141
Belting, cs.	2	263
Brass g'ods, cs	3	875
Pl't'd g'ods, cs	1	1,200
Scale	1	585
London.		
Hdw., cs	18	692
Sew. mach., cs	252	5,012
Mach'y, pkgs	5	746
Scales, cs.	106	5,780
Stoves, pkgs.	22	400
C'ge mtls., pgs	133	2,875
Pumps, pkgs.	3	250
Ag. imp., pkgs	3	350
Mf. iron, pkgs	55	624
Hull.		
Clocks, bxs.	193	4,320
Ag. imp., pgs.	99	2,870
Hdw., pkgs.	768	18,009
Cop. goods, cs	52	6,871
Pumps, pkgs.	19	840
Glasgow.		
Machy., pkgs.	21	3,150
Clocks, bxs.	22	472
Cronstadt.		
Rr's cups, bbl	900	77,048
Revolvers, cs	135	101,250
C'tridges, cs.	6980	212,541
Cuba.		
Cop. pipes, bx	2	100
Clocks, pkgs.	6	76
R.R. ir'n, tons	1060	2,625
Grindstones	228	340
Ag. imp., pgs.	73	2,954
Mf. iron, pkgs.	2424	17,431
Iron, pkgs.	44	941
Rosin oil, bbls.	40	325
Lasts, cs.	3	217
Lamps, pkgs.	11	592
Windmills	3	600
Barrows	72	90
Tank	1	2,200
Wheels, pcs.	64	655
Pl't'd w're, cks	3	87
Tinware, pkgs	3	84
Nails	403	1,266
Mach'y, pkgs.	137	16,182
Sew. Mach., cs	218	5,383
Nails, pkgs.	7	60
Hdw., cs.	239	3,346
Gas fixt., cs.	2	189
Bellows, pkgs.	21	272
Porto Rico.		
Hdw., cs	8	213
Chili.		
Burners, cs.	2	100
Mf. iron, pkgs.	171	607
Revolvers, cs.	1	150
Mach'y, pkgs.	8	968
Coal, tons	741	960
R. R. materials, a lot of.		1,400
Hdw., cs.	369	4,300
L'p. g'ds., pgs	152	2,437
Shoe nails, cs.	54	333
Pumps, pkgs.	4	170
Ag. Imp., pgs.	255	4,005
Cartridges, cs.	9	348
Rifles, cs.	2	600
Canada.		
R'ssia ir'n, pgs	25	480
Tinware, case	1	362
British North American Colonies.		
Hdw., cs.	20	730
Mf. iron, pkgs	86	934
Clocks, pkgs.	13	138
Brass g'ds, cs.	8	560
Tinware, cs.	2	92
Dutch West Indies.		
Hdw., bxs.	23	382
R. R. bars	204	1,178
Mf. iron, pkgs.	84	300
British Australia.		
Hdw., pkgs.	234	4,510
Ag. imp., pkgs	53	3,004
Mf. iron, pkgs.	21	283
Car mtls., pgs.	200	3,545
Havre.		
Copper, cks.	152	38,000
Ag. imp., pkgs.	17	790
Sew. mach. bx	101	1,040
Cop. goods, cs	15	1,500
Mach'y, cs.	1	50
Carriage	1	1,000
Hayti.		
Nails, kegs	30	80
Mf. iron, pkgs.	59	523
Hdw., cs.	2	50
Rifles, cs.	3	1,750
Lea. hose, bdl	1	455
United States of Colombia.		
Rev'lvers, bxs	2	252
Mf. iron, pkgs.	18	2828
Mach'y., pkgs.	206	16,757
Ag. imp., pkgs	75	2,461
Sew. mach., cs	104	4,062
Cutlery, pkgs.	182	3,287
Hdw., cs.	179	10,355
Clocks, cs.	25	1,618
Powder, lbs.	1564	362
Venezuela.		
Iron tank	1	115
Belting, case.	1	145
Sew. mach., cs	3	90
Hdw., pkgs.	31	484
Carriages	6	1,800
Revolvers, cs.	1	500
Argentine Republic.		
Pistols, cs.	1	100
China.		
Hdw., cs.	9	180
Coal, tons	226	800
Nails, kegs	100	335
Mf. iron, pkgs.	59	709
Pumps, pkgs.	5	286
Burners, cs.	7	375
Cartridges, cs.	750	2,250

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending Sept. 4, 1877 :

Hardware.

Boker Hermann & Co.
Wads, cs., 3
Cutlery, cks. 2; cs. 10
Bryce, William & Co.
Casks, 9
Burkinshaw W. C.
Packages, 5
Degraw Aymer & Co.
Chains, 3 ; cks., 2
Drexel, Morgan & Co.
Cutlery, cs., 1
Files, cks., 9
Folsom H. & D.
Arms, cs., 2
Frasse, P. A. & Co.
Mdse., pkgs., 8
Harmar W. & Co.
Cases, 4
Harrison Bros. & Howson.
Cutlery, cs., 4; cks., 1
Merchants' Dispatch Co.
Guns, cs., 2
Casks, 16
Wadding, cs., 9
Gun caps, cs., 3
Eason John W.
Wire rope, coils, 6
McCoy & Co.
Mdse., pkgs. 2
Squires H. C.
Guns, cs., 2
Sondheim B. & Co.
Cases, 10
Schoverling & Daly,
Gun caps, cs., 8
Wadding, cs., 11
Tillottson L. G. & Co.
Galv'd wire, lots, 356
Van Nest A. R. & Co.
Mds., pkgs. 5
Witte John G. & Bros.
Mdse., pkgs, 1
Ward Asline,
Casks, 10
Wiebusch & Hilger Hdw. Co.
Cutlery and Hdw., pkgs., 22
Anvils, 200
Order,
Cases, 4
Packages, 8
Per. caps, cs., 3

Iron.

Ainswick, G. & Co.
Ore, tons, 193
Mitander Nils,
Bars, 2633
Naylor & Co.
Bars, 10,721
Spiegel, tons, 161
Phelps, Dodge & Co.
Sheet, bdls., 165
Order,
Scrap, tons, 12

Steel.

Brown William,
Packages, 83
Carey & Moen,
Rods, bdls., 427
Naylor & Co.
Spring, lots, 1
Sulzbacher, Hyman Wolffe,
Casks, 3
Cases, 8
Bundles, 3
Bars, 12
Order,
Spring, lots, 1
Tires, 3
Rods, bdls., 137
Bundles, 12
Cases, 13
Boxes, 1

Metals.

Alexander F. & Sons
Copper, bars, 161
Bear J. & Sons,
Tin plates, bxs, 134
Bruce & Cook,
Tin plates, bxs., 1567
Byrne Jos. & Co.
Tin plates, bxs., 1536
Cort N. L. & Co.
Tin plates, bxs., 800
Dickerson, Van Dusen & Co.
Tin plates, bxs., 755
Dale John G.
Tin plates, bxs., 1430
Handrick Bros.
Lead, pigs, 974
Jackson R. D.
Bar tin, bbls., 10
Montell F. T. & Sons,
Scrap metal, cs., 1
Menacho R.
Scrap cop'r, pkgs., 6
Naylor & Co.
Tin plates, bxs., 4539
Phelps, Dodge & Co.
Tin plates, bxs., 3556
Black tag'rs, bxs., 13
Tin, ingots, 600
Pratt Chas. & Co.
Tin plates, bxs., 526
Societe de Credit Suisse,
Tin slabs, 635
Wheeler E. S. & Co.
Tin plates, bxs., 770
Order,
Lead, pigs, 1723
Tin, ingots, 726
Tin plates, bxs., 3803
Tin, bbls., 7
Bar tin, bbls., 10
Tin slabs, 50

COAL.

The situation in the Coal market is unchanged from last week. There is a fair demand with steady prices, but there seems to be no anxiety among buyers. The unusually large tonnage of the Philadelphia and Reading Company, together with that of the other companies which are at work, has prevented any scarcity from being felt ; consequently prices have advanced but slowly. At the present time of writing the asking price of the Philadelphia and Reading is so high as to amount to a withdrawal for a time from the market—Stove, for example, being quoted at $4.45, with a very high freight, bringing the price considerably above the market. We believe the quotation here is $4.95. Lehigh we heard quoted yesterday at : Lump and Broken, $3.50 ; Stove, $3.75 ; Chestnut, $3.25, f. o. b. Higher prices than these have been quoted, but Coal can be

obtained at the figures named, or even lower. The condition of affairs at the mines has not changed materially, except that the miners' resources are reduced as each week goes by. How long they will hold out is uncertain, but from present appearances it would not seem that they are in a position to sustain the struggle for any considerable length of time. In some of the regions the storekeepers' patience is exhausted and they wish cash for their goods. The supplies obtained by raiding upon farmers cannot be a very great aid. Under these conditions a serious struggle can hardly be expected. Some gentlemen go so far even as to predict resumption within a very short time. Be this as it may, there is evidently no cause for alarm. The country is so well stocked that the price will not probably advance to an unreasonable figure in any event, while, should a general resumption take place, the production will be sufficiently large to cause a slight falling off in prices.

OLD METALS, PAPER STOCK, &c.

The demand for Old Metals still continues very light. Copper, Brass, Composition and Lead are in very little request. Dealers are holding their stocks with the expectation of obtaining better prices at the opening of the fall season. There is, however, a better feeling in connection with Machinery Iron, Light Iron and Stove Plate, which is moving freely at firmer rates. The Rag and Paper Stock market is without activity. Newspaper stock has declined ¼c. a pound. Grass Rope has greatly improved and is now in good demand. Other articles continue materially unchanged.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper	$0.14	@	$0.15 per lb
Yellow Metal	.10	@	.... "
Brass	.08½	@	.... "
Composition, heavy	.12	@	.... "
Lead, solid	.04	@	.... "
Tea Lead	.03½	@	.... "
Zinc	.03½	@	.... "
Pewter, No. 1	.13	@	.... "
Pewter, No. 2	.08	@	.... "
Spelter	.05½	@	.... "
Wrought Iron	18.00	@	.... per ton.
Light do	12.00	@	.... "
Stove Plate	9.00	@	.... "
Machinery do	12.00	@	.... "
Burned Iron	4.00	@	.... "

The prices current for Rags, &c., are as follows:

Canvas, Linen	4½	@	5 c.
" Cotton, No. 1	5½c.	@	....
" " No. 2	2½c.	@	....
White No. 1	5 c.	@	....
" No. 2	3 c.	@	....
Colored do	2 c.	@	....
Mixed, Woolen	2 c.	@	3 c.
Soft, do	5½c.	@	6 c.
Gunny Bagging	3 c.	@	....
Jute Butts	2¾c.	@	....
Kentucky Bagging	3 c.	@	....
Book Stock	2½c.	@	....
Newspaper Stock	2 c.	@	2¼c.
Waste Paper and Scraps	1¼c.	@	....
Kentucky Bale Rope	4 c.	@	....
Cakum Junk, No. 1	4½c.	@	5 c.
" No. 2	3 c.	@	....
Tarred Shaking	1 c.	@	1¼c.
Grass Rope	3 c.	@	3¼c.

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, September 5, 1877.

General business continues in a healthy condition, with encouraging prospects of a good fall trade. The average improvement is quite marked, although some branches of trade have not yet experienced much change. Others report occasional "spurts," with indications of good times near at hand, but as we said before, the universal testimony is that "things are a great deal better, and we expect a good fall trade." The Iron trade is the only exception, and that is as dull and inactive as at any time during the year. It seems impossible to get up any enthusiasm, or to stimulate business in the least, and it is not very likely that there will be much improvement this year. There is, however, as much confidence felt in this department as in any other, and although there is no present activity, the future is regarded with the utmost confidence.

While a decided improvement is already realized in many departments, the future is full of promise, some of the leading features being indicated in our trade report of Aug. 9th, and are now being realized. We notice that the railway companies have decided to advance East-bound freights about 17 per cent., a most important and eminently wise movement. The prosperity of the agricultural classes being assured by bountiful crops and a large foreign demand at high prices, the railway interest very properly comes in for its share by increased earnings, enabling them to pay off indebtedness, enter the market as buyers of supplies and equipments, and it is hoped in some cases, be enabled to pay dividends. With these (the most important interests in the country) in good condition, it will be strange indeed if business does not improve in every direction, and it is undoubtedly now only a question of time when all our manufacturing and mercantile interests will enter upon a period of permanent prosperity.

Pig Iron.—The market during the past week has been quiet and steady, but no special activity has been developed. Holders are firm, and at the present time, seem to have the market pretty well under control. There is no pressure to sell, neither do buyers show any disposition to anticipate their requirements. The Manufactured Iron trade generally continues dull and inactive, and with no increase in the demand for Finished Iron, the demand for Pig cannot be very large. There is the fullest confidence, however, that an improvement is near at hand, that the turning point has been passed, bottom touched, and prices already on the up grade. This is probably correct, and although other departments of trade are beginning to experience increasing activity, there is not much prospect of such an event in the Iron trade during 1877. Prices may probably stiffen a little, but there are no indications of a large demand, and until that comes, it is useless to expect any permanent improvement in the condition of affairs. The outlook in regard to the future is cheerful, however, and it is in all probability only a question of time when this important interest will in some measure, at least, regain a share of its former prosperity. We cannot make any change in quotations, although sales at the inside figures are quite exceptional, and transactions are generally at full figures. We quote the market firm at the following figures: No. 1 Foundry, $18 to $19; No. 2 Foundry, $17 to $17.50; Gray Forge, $16.50, with special brands held at $1 to $1.50 per ton more.

Plate and Tank Iron.—The demand is less active, and there are general complaints of dullness at all the Plate mills. Some time ago there were inquiries for large lots of Plate Iron, and it was expected that the result would be an important increase in the demand, but so far such has not been the case. Shipbuilding is active for the time being, but outside of that there is not much demand. There is no change in prices, and we continue our late quotations as follows: Ship Plates, 2.37½c. to 2.50c.; Tank Iron, 2⅝c. to 2⅞c.; Shell Iron, 3c.; Flange Iron, 4c. to 4½c., and Best Bloom, 5½c. to 6c.

Sheet Iron.—The demand is well sustained, and the mills are actively employed in keeping up an assortment of stock. Orders are not large, but as stocks in consumers' hands have been down to a very low point they are compelled to make frequent purchases. Taking everything into consideration the Sheet mills have no cause to complain. Prices are unchanged and steady, with a firm feeling and anticipation of higher prices at a date not far distant. We quote: Refined Sheet Iron, No. 26 to 28, 3¾c.; No. 22 to 24, 3½c.; No. 16 to 21, 3¼c.; Best Bloom Sheets, No. 26 to 28, 5½c.; No. 22 to 24, 5¼c.; No. 16 to 21, 5c.; Common Red Plates, 5-16 to 18, 2⅜c. to 2½c.; Refined Plates or Blue Annealed, 5-16 to 18, 2¾c.; American R. G., 5-16 to 18, 3¼c.; Best Bloom, 5-16 to 18, 5c.; Philadelphia Russia, 9c.; Bloom Galvanized, list, 45 per cent.; Refined Galvanized, list, 50 per cent.

Bar Iron.—Business generally is reported exceedingly dull, and, in some cases, we hear of Iron being offered at unusually low figures, but buyers will not anticipate their wants, and no inducement appears to be sufficient to change their views in regard to the future. Those who want a first-class Iron are willing to pay the price for it, and no reduction will induce parties to take an article they do not require. In other words, there is only a limited demand, and beyond that business cannot be forced. There is a better feeling in regard to the future, and the utmost confidence is felt that the improvement cannot long be delayed. The Iron trade is generally the last to feel a depression in business, and also the last to recover from its effects. With general improvement in other departments, and with every reason to believe it will be permanent, it is only a question of time when the Iron trade will revive. In the meantime we quote the market dull and quiet, with prices according to quality: Common Iron, 1.65c. to 1.75c., and Best Refined, 2c. to 2.1c.

Muck Bar.—There is very little business doing, the only sale reported being a few hundred tons at $33, Philadelphia delivery, which may be considered a fair quotation.

Steel Rails.—The past week has been one of dullness and inactivity, and we cannot report any sales of importance. Prices are steady however, and there is a general impression that they have reached bottom. Inquiries are numerous, and there are indications of considerable business in the immediate future, but at the rates now ruling sellers are not willing to enter orders unless for cash and prompt delivery. The mills are fully employed, and although their old contracts are being rapidly run off, there is every reason to think the demand will keep them steadily at work. The improving condition of business, as shown in the increased earnings of the roads, will enable them to purchase Rails and other equipments, and it is reasonably certain therefore, that the Steel Rail Mills will come in for some share of prosperity, in common with other branches of trade. Two out of the eleven mills are still closed, with no immediate prospect of either of them starting up again. We continue our quotations of last week, say $44 to $45 cash at mills, at which figures the market is quiet and steady.

Iron Rails.—There is a moderate business doing, but at somewhat irregular rates, price being according to quality, section, terms of payment and delivery. There are several inquiries in the market which may lead to further business, but the difficulty is in getting satisfactory recurities. Rails are needed by many roads, and if their earnings continue to increase, it is expected that some of them at least will soon be in the market as buyers. We quote on a cash basis at mills, according to quality, $31 to $35.

Old Rails.—The offerings are large, and the maaket dull and heavy. Some parties talk of sales at higher prices, but the only transactions we can verify have been at $18.50 to $19. There is no doubt Old Rails are being used quite extensively, but declining prices show that the supply is more than equal to the demand. We quote $18.50 to $19.50 as covering the whole market, according to terms and quality.

Old Car Wheels—Are nominal at $18.50 to $19.50. No sales reported for some time.

Old Car Axles.—There is very little demand, and under large offerings holders have reduced their figures without finding buyers. We quote the market dull and nominal at $25 to $27, according to quality.

Scrap Iron.—The market is dull and quiet, but there is no change in prices, and we continue our late quotations: Wrought, $22 to $23; Cast, $15 to $16.50.

Nails.—The demand continues to be very satisfactory, and prices are well sustained, say $2.50, with 10c. rebate to the trade.

Lead.—Business does not improve, and sales are in small lots, at somewhat lower prices, say $4.90 to $5 for Common, and $5.15 to $5.20 for Refined. Manufactured continues in good demand, and shot active, all at former quotations as follows: Bar, 6½c.; Pipe, 8½c.; and Sheet, 9c.; Shot—Drop, 8¾c. to 9¾c.; Buck, 9¾c. to 10¾c., all less 10 per cent. to the trade.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue,
PITTSBURGH, Sept. 4, 1877.

While general business continues backward, as compared with what it should be at this season of the year, it is improving nevertheless, and the outlook is more favorable for the fall trade. With a resumption of river navigation, which is not likely to be much longer delayed, business in manufacturing circles will be considerably improved, and then there is a large quantity of Coal and Coke ready to move for the Southern and Western markets just as soon as there is sufficient water to let it out.

Pig Iron. There has been a slight improvement in the volume of business during the past week, several small lots of Mill Irons having changed hands, and the probability is that there will be an increased demand the coming week, as some of the mills are starting up, and they are nearly all bare of stock. It is evident, however, that consumers are determined to adhere closely to a very conservative policy, buying only to supply immediate actual wants, hence the inquiry now is for 50 or 100 tons, whereas in former years at this particular time it was nothing unusual for mill owners to buy from 1000 to 2000 tons at a time. There is an increasing demand for Foundry Irons, but no improvement in prices, nor is it expected that there will be any immediate advance in the value of either Foundry or Mill Iron, as the production, notwithstanding it is down lower probably than at any time since the panic, is still in excess of the consumption. One of the main reasons why there are no quotable improvement in prices lies in the fact that there are quite a number of furnaces ready to start up just as soon as there is any show of getting a new dollar for an old one, and consumers, as long as there is no probability of higher prices, will not be disposed to anticipate future wants. The situation is anything but encouraging for the producing interest; current rates scarcely cover actual cost, and the cost of both labor and fuel is more likely to be increased than diminished. Prices unchanged. Connellsville coke selling at $18 to $19, 4 months, for Gray Forge, and Bituminous Coal fuel at $20 to $21, 4 months, for good Cold-short and Neutrals to best brands of Red-short. No. 1 Foundry, $22.50 to $23, 4 months; No. 2, ditto, $21 to $22.

Manufactured Iron.—The general position of the market has not changed materially since this day week, as noted in my last report; notwithstanding some manufacturers continue to speak despondingly both of the present and future, others talk more hopefully, and a much firmer feeling is being developed. The fact is makers generally have come to the conclusion that they will not sell unless they can obtain cost of production, and prices are higher than they were sixty days ago; moreover, the enhanced cost of coal, and demands of some laboring men employed in the mills for increased pay, together with the fact that the puddlers and rollers do not propose to submit to any reduction, are not without their effect in the same direction. It is plain, in view of what has been stated, prices cannot go lower, but on the contrary are more likely to advance than decline, and this being the case, buyers need have no apprehension in anticipating future wants; and another important consideration which should be borne in mind is that stocks in first hands are comparatively light. For several months past manufacturers generally have been gauging their production by their orders, and the probability is that this course will be pretty closely adhered to for some time to come, as there is no inducement in the present condition of affairs to accumulate stock. Probably not much, if any, over one-half of the capacity here in Pittsburgh is employed at the present time. Some mills are still standing idle, while but few if any of those running are working up to anything like their full capacity, and it is presumable that the same is true elsewhere. Quotations may be given on a basis of 1.80c. to 1.90c. for Bars, with some few makers refusing to book any orders under a 2 cent base.

Nails.—The demand is increasing as the season advances, and the market is firm, with no disposition to cut, either here or at Wheeling. The fact is there are intimations of an early advance, and as current rates afford very little margin for profit and the indications are favorable for a good fall trade, a higher range of prices soon is not improbable. Manufacturers here are nearly if not all refusing to make contracts for future delivery at current rates, and they are not anxious to sell for immediate delivery, except in a small way, in view of the probability of an early advance. We continue to quote at $2.25, 60 days, with the usual discount of 2 per cent. for cash. Nearly all the factories here are now running, and the probability is that they will all be busy during this month and possibly October.

Horse and Mule Shoes.—Nothing new to record; business continues fairly active, although not any more so than usual at this season of the year. Shoenberger & Co. continue to quote, in one hundred keg lots, at $3.80 and $4.80, and Rees, Graff & Wood, 30c. per keg off on one hundred lots.

Wrought Pipe.—Business here is more active; some firms report that they are quite busy; it is evident, in view of the liberal shipments that are being made daily, that orders are coming forward more freely, and about the only complaint just now is in regard to prices, which in addition to being irregular are being shaved so very close, that profits are very small. As noted in *The Iron Age* some time ago, there is no uniformity in prices, each firm or company making their own rates, hence shaving is the order of the day.

Steel.—There is a continued fair degree of activity. The mills are all running; some of them reported quite busy, and there is not much doubt but this will continue to be the case until the close of the year. Prices continue to rule in buyers' favor, and while for small job lots there has been no recent change, orders for round lots, it is understood, can be placed lower, and in order to obtain large orders, makers are obliged to shave very close. The consumption is steadily increasing every year, as is also the production; hence there is no chance for monopoly, and the largely increased consumption during the past few years is owing to the very low prices of American, in consequence of which Foreign Steel could not be imported to compete with it. And then, owing to its cheapness, it has, for many purposes, taken the place of iron.

Scrap.—The movement in all kinds of Scrap continues light, and prices are weak but unchanged. Old Rails are still quoted at $19 @ $20, 4 months; Old Car Wheels, $20 @ $21 per gross ton; No. 1 Railway Scrap, $24 per net ton; Car Springs, $37 @ $39. The demand is mainly for small lots, and prices continue in buyers' favor. Dealers are working on smaller margins now than at any time since the panic.

Coke.—There is no improvement in the trade, nor is it likely that there will be while so many pig iron furnaces are out of blast. No change in prices, which to makers are very unsatisfactory, $2.25 to $2.50 per ton, delivered free on cars in Pittsburgh.

Window Glass.—It is customary with most of our manufacturers to start up about the 1st of this month, but as the trade is very slow it is not likely that they will be in any hurry about it. Discounts unchanged, 70 per cent. for car-load lots. The combination rates are being closely adhered to.

The Exposition was opened up to-day, and indications are that it will be a success. The display of goods is said to be quite creditable, and as there is no Centennial on hand this year the attendance, it is thought, will be much larger than that of last year, when it wound up considerably behind.

CLEVELAND.

CLEVELAND, September 4, 1877.

Iron Ore.—The demand for Lake Superior ores is exceedingly light just at this time. The mining companies hoped that the promise of an abundant harvest in the northwest and the foreign demand for our cereals would have given an impetus to take freights before this time, and thereby indirectly influence the price of ore, the cost of transportation being increased. This hope is not yet realized. The docks remain crowded with ore, unsold or uncalled for. The late financial disasters in the northwest have so affected the producers of certain ores that they are obliged to sell at almost any price. This fact has had the effect of bringing the price, particularly of Hematite ores, down to ruinous rates.

Pig Iron.—The consumption of Pig Iron remains about as it was on the first of August. The mills are consuming very little, confining themselves almost entirely to scrap. The foundries are beginning to lay in for fall, though not in very great quantities. The price of good foundry Pig Iron remains firm at $22 to $23, while poor grades find slow sale at $21 to $20. There are no sales of Mill Iron worthy of mention. There is not much trade in Charcoal Pig, and the holders of it have the good sense not to urge it upon an unwilling market, and prices, consequently, are not particularly affected by the slowness of trade.

Bar Iron and Nails.—The business in the manufactured articles remains stationary and advertised rates are generally maintained. Buyers are growing more particular about quality, and are more willing to pay living prices for guaranteed or standard quality.

Scrap Iron and Rails.—These are in very active demand. Old Rails for present delivery are especially scarce, and an advance in price has been sustained, although $20.50 is about the quotable value, with none to be had.

BOSTON.

SEPT. 1.—*Iron.*—Pig continues dull, with prices no firmer. We quote $22 to $23 for No. 1; $21 to $21.50 for No. 2, and $20.50 to $21.50 for Gray Forge. Scotch Pig is dull at $26 to $30 for store lots. *Bar.*—There has been a slight improvement. We quote $43 to $45 for Refined, and $35 to $36 for Common. Nails are in light demand at unchanged prices. Sheet is selling at 3c. to 3¼c. per pound. Russia is quiet at 12c., currency. We quote: English Spring Steel, 7c. to 8c. gold; 9c. to 11c. for German; 9c. to 11c. for Machinery; 14c. to 16c. for Cast; 10c. to 12c. for Blister; 8c. for American Spring; 13½c. to 14c. for Cast; 9c. for Blister, and 8c. for Machinery. *Copper* is quiet, and the demand is very light. Small sales are made here at 19c. to 20c. For Manufacturers we quote: New Sheathing, 28c.; Bolts and Braziers, 30c.; Yellow Metal Bolts, 25c. to 25½c.; do. Sheathing, 20c. *Lead* is a trifle firmer, though the demand is light. We quote Pig 5⅛c. to 5¼c., currency. For Domestic Sheet, 9c.; Pipe, 8½c.; Tin-Lined Pipe, 16c.; Bar Lead, 7½c.; all of these, excepting Pig, subject to the usual trade or 10 per cent. discount. *Antimony* is quiet at 11¾c. to 12¼c., gold, for Boston spot lots, and *Spelter* is easy, closing at $6 on the spot for 10-ton lots. *Tin* continues weak. A large amount is on the way, which tends to depress prices. We quote Straits, 15½c. to 15¾c.; Banca, 18c. to 18½c.; Refined English, 15c. to 15¾c., gold. We quote Plates: Charcoal, I. C., $7 to $7.25; Coke, $6 to $6.25, and Terne at $6.50 to $7, gold.—*Commercial Bulletin*

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Sept. 1, write us as follows: PIG IRON.—The market continues without change. A few large sales have been made, but usually at some slight concession in price:

HOT-BLAST FOUNDRY.

Hanging Rock No. 1, Charcoal	₩ ton.	$23.00 @	24.00	—4 mos.
Hanging Rock No. 2, Charcoal	22.00 @	....		—4 mos.
" No. 1 Coke	23.00 @	24.00		—4 mos.
" No. 2 "	22.00 @	22.50		—4 mos.
" No. 1, Stonecoal	21.00 @	22.00		—4 mos.
Virginia, No. 1 Coke	24.00 @	....		—4 mos.
" No. 2 "	22.50 @	....		—4 mos.
Ala. and Tenn., No. 1 Charc'l.	22.50 @	23.00		—4 mos.
" No. 2 "	21.50 @	....		—4 mos.
Red-short, No. 1 Coke	.... @	....		—4 mos.
Fannie U. S. Scotch No. 1	23.00 @	....		—4 mos.
Alice " No. 1	24.50 @	....		—4 mos.
Am. Scotch No. 1	21.00 @	22.00		—4 mos.

FORGE IRONS.

Hanging Rock No. 1 Charcoal	₩ ton.	$21.00 @	....	—4 mos.
Hanging Rock No 1 Coke	21.00 @	....		—4 mos.
Virginia, No. 1	20.00 @	....		—4 mos.
Ala. and Tenn. No. 1 Charc'l.	20.00 @	....		—4 mos.
Red-short, No. 1 Coke	22.00 @	22.50		—4 mos.
Cold-short, No. 1 Stonecoal	19.00 @	20.00		—4 mos.

CAR WHEEL AND MALLEABLE.

Hanging Rock	₩ ton.	$40.00 @	....	—4 mos.
Southern and Western Brands.	30.00 @	....		—4 mos.

ORE.

Lake Superior	8.50 @	.....	—cash.
Virginia Hematite (Washed)	4.25 @	.....	—cash.

CHATTANOOGA.

Specially reported by S. B. Lowe, Dealer in Metals, under date of Sept. 3: For the past week the inquiry and demand for Pig Iron has been very slack, while the demand for Bar Iron and Nails exceeds the supply. In prices there is no change except in Nails, which have advanced:

COKE.

No. 1 Foundry, extra	$20.00 @	21.00	
No. 1 Foundry	19.00 @	20.00	
No. 2 Foundry	17.00 @	18.00	
Gray Forge	15.00 @	16.00	
White and Mottled	14.00 @	15.00	

HOT-BLAST CHARCOAL.

No. 1 Foundry, extra	$19.50 @	20.50	
No. 1 Foundry	19.00 @	20.00	
No. 2 Foundry	17.00 @	18.00	
Gray Forge	16.00 @	17.00	
White and Mottled	15.00 @	....	

COLD-BLAST CHARCOAL.

Car Wheel Metal	$22.50 @	27.50	
" extra	24.50 @	29.50	
Forge Metal	17.50 @	22.50	
Muck Bar	29.00 @	34.00	
Old Car Wheels	17.00 @	....	
Old Rails per ton	16.00 @	17.00	
Brown Hematite Ore 50 to 56 per cent. per ton	1.75 @	2.25	
Red Fossiliferous Ore, 50 to 56 per cent. per ton	1.50 @	1.75	

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Sept. 3, write us as follows: Continued signs of improvement. Prices are still low, but the demand for all grades is increasing in volume. The usual time, four months, is allowed on the quotations below:

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	$23.00 @	24.00	
No. 2 " "	20.00 @	21.00	
No. 1 Southern, Charcoal	20.00 @	21.00	
No. 2 " "	19.00 @	20.00	
No. 1 Hanging Rock, Stonecoal and Coke	20.00 @	22.00	
No. 2 Hanging Rock, Stonecoal and Coke	19.00 @	20.00	
No. 1 Southern, Stonecoal and Coke	19.00 @	20.00	
No. 2 " "	18.00 @	19.00	
"American Scotch"	20.00 @	22.00	
Silver Gray	18.00 @	19.00	

MILL IRONS.

No. 1 Charcoal, Cold-short and Neut'l.	18.50 @	19.50	
No. 1 Stonecoal and Coke, Cold-short and Neutral	18.00 @	18.50	
No. 2 Stonecoal and Coke, Cold-short and Neutral	17.50 @	18.00	
No. 1 Missouri and Indiana Red-short	21.00 @	22.00	
White and Mottled, Cold-short and Neutral	15.00 @	16.00	

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	34.00 @	38.00	
Alabama and Georgia, Cold-blast	25.00 @	33.00	
Kentucky, Cold-blast	25.00 @	33.00	

W. B. BELKNAP & Co., Iron Merchants, Louisville, Ky., under date of Sept. 3, report continued business activity. The past week has developed a large demand, especially for Wagon Hardware, Nails and Horse Shoes. No quotable change in prices. Nail manufacturers are beginning to talk confidently of a probable advance in the card. There is no doubt that present rates at factory net the maker an absolute loss. Buyers are not so timid as they were, and will not hesitate to invest on the first sign of recuperation.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel Merchants, 46 and 48 South Charles street, report us the following prices, under date of Sept. 3: Business continues improving and moderately active, with a strong undertone of confidence manifesting itself throughout the community. Prices rule firmer at unaltered values:

AMERICAN REFINED BAR IRONS.

1 to 6 wide by ¾ to 1 thick.... 1 to 4½ wide by 1⅛ to 2 thick.	....1.95 to 2c.	₩ lb	
Round and Square, ordinary sizes from ¾ to 2 inclusive	1.95 to 2c.	"	
Hoop iron, 1⅛ wide and upward	3 to 3¼c.	"	
Band Iron, from 1¼ to 4 in. wide	2¾ to 3c.	"	
Horseshoe Iron ¾ to 1 wide by ⅜ to ½ thick	3¾ to 3¼c.	"	
Norway Nail Rods	5½ to 6c.	"	
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	14½ to 15c.	"	
Machinery Steel	8c. to 9c.	"	
Cast Spring Steel	7½ to 8c.	"	
Homogeneous Steel Plate	8½ to 9c.	"	
Perkins' Horseshoes, per keg of 100 lbs.	$4.02½		
" Muleshoes	5.02½		
R. R. Spikes	3¼c. to 2¾c.		
Common Horse Nails, from 14c. to 18c. per pound	20 9 8 7 6		
Putnam Horse Nails	23 24 25 26 28c.	per lb	
Globe Horse Nails	23 24 25 26 28c.	per lb	

Messrs. R. C. HOFFMAN & Co., Iron and Commission Merchants, No. 23 South Frederick street, report the Pig Iron market as follows, under date of Sept. 3: The Iron market unchanged, and we quote prics as follows:

Baltimore Charcoal	$29.00 @	31.00	
Virginia	28.00 @	31.00	
Anthracite No. 1	19.00 @	20.00	
" No. 2	18.00 @	19.00	
" No. 3	17.00 @	18.00	
White and Mottled	15.00 @	16.00	

ST. LOUIS.

Specially reported by Messrs. SPOONER & COLLINS, Iron Commission Merchants, 217 North Third street, St. Louis, under date of Aug. 30: The demand is improving, though prices remain unchanged, and no prospect of any advance. We anticipate a good fall trade:

	No. 1.	No. 2.	Mill.	White and Mot'ld
Missouri Stone Coal	$22.00	$21.00	$20.00	$19.00
Missouri Charcoal	22.00	21.00	20.00	20.00
Tennessee Charcoal	22.50	21.00	20.00	19.00
Southern Coke, very soft and strong	23.00	21.00	20.00	18.50
Hanging Rock Charcoal	25.00	24.00	23.00	.....
H. R. Charcoal, Cold-short	24.00	23.00	.....	.....
	Extra No. 1.	No. 1.	B. No. 1.	No. 2.
Hanging Rock Coke	25.00	24.50	24.00	22.00
West Virginia, Coke	23.50	23.00	22.00	21.50

COLD-BLAST CHARCOAL—All Numbers.

Hanging Rock	$25.00 @	38.00	—4 mos.
Tennessee	26.00 @	30.00	—4 mos.
Kentucky	26.00 @	30.00	—4 mos.
Missouri	26.00 @	30.00	—4 mos.
Georgia	26.00 @	30.00	—4 mos.
Alabama	26.00 @	30.00	—4 mos.
Assorted Bar Iron	... @	$2.00	rates.
No. 1 Railroad	1.00	per hundred	
Machinery Scrap "	.80 @	"	
Heavy Cast " "	.65 @	"	
Light Cast " "	.55 @	"	
Old Rails	19.00 @	20.00	—4 mos.
Old Car Wheels	17.00 @	18.00	—4 mos.

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of Sept. 3: The demand for the usual grades of Foundry Pig Iron continues fair. Wheel Irons are dull. Prices unchanged:

Va. Cold-blast Charcoal,	Cold-short	$21.00 @ 25.00
Va. " "	Neutral	30.00 @ 32.00
Anthracite, No. 1 X		20.00 @ 21.00
" No. 2 X		19.00 @ 20.00
" No. 2		18.00 @ 19.00
Coke, No. 1 X (West Virginia)		22.00 @ 23.00
" No. 2 X "		21.00 @ 22.00

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels).

PARIS, Aug. 19, 1877.—*Metals.*—Although not yet active, business in metals has been steadier, and there is, on the whole, an undertone of greater confidence. Soon our chief operators will be back at their places of business. We may then look forward to a more active resumption of actual dealings, and we trust that the fall season will be inaugurated in a promising manner. *Copper.*—This metal is firmer and slightly better, although but moderately active in this city. We quote: Chili Bars, 183.75; Common ditto, 178.75; Ingots and Slabs, 187.50; English Best Selected, 192-50; and pure Corocoro Ore, 186.25. Havre is a little weaker, and the quotations are as follows: First brands Chili Bars, 181.25 to 182.50 francs the 100 kilos, Paris conditions; good current ditto, 180; and Lota and Urmeneta, 177.50 to 178.75. At Marseilles Copper is stationary. Red Tokat, 170 francs; small Refined Ingots, 175 to 180; Sheathing, 210; Bolts, 215; and Yellow Metal Sheathing, 205. *Tin.*—The French markets have followed in the wake of those of England and Holland. Consumers in the interior persist in holding as little stock as possible, preferring that the ports should continue to hold for them, and they only enter the market when compelled by urgent wants. Hardly anything has transpired here. We quote: Banca, 185.50 francs the 100 kilos; Billiton, 177.50; Straits, 179; Australian, 174.50; and English, 175.50. Marseilles is again weaker, Straits being offered there from Singapore at 170 francs, afloat. They quote on the spot, Banca, 185 francs; Straits, 175; Billiton, 175 to 180, and English Refined, 185. *Lead.*—Lacks activity and is weak at Paris. We quote here, French, Belgian and German, 50.50 francs the 100 kilos, and Spanish and English, 49.75. At Havre Spanish is bringing 50.50 to 51. At Marseilles soft has been a good deal firmer during the week, owing to some large transactions for export and the much reduced stock on the spot. They quote first fusion, 49 francs; second do., 47.75; Sheet and Pipe, 53, and Shot, 53. *Spelter.*—The improved tone which has obtained in Germany has met with no response in the French markets thus far. Here little is doing. We quote Silesian, deliverable at Havre, 51 francs; other good brands, 50.50, and at Paris, 50.50. Havre quotes Silesian nominally 50.50 to 51. Absolutely nothing transpires at Marseilles, where Vieille Montagne Sheet sells at 68 francs the 100 kilos, less 3 per cent. discount, and other brands at 67; old remelted in slabs, 42. *Iron.*—A revival in Iron matters seems to be drawing near. At Paris there is plenty of work, and all our Iron works have their hands full of orders. Although the profits made may be modest, they at least suffer no losses. Flooring Iron is bringing 190 to 195, and Sheet, 190 to 240. In the Champagne district activity has abated somewhat. Some orders are being filled there for special Irons and Sheet. They quote "affinage" Pig, 110 to 118; Sheet, 172 to 225; thin do., 190 to 235. In the Meurthe and Moselle the stocks of Pig Iron accumulate, yet production is proceeding undaunted. In the Loire district architectural Ironwork is in request, but the general market remains quiescent. The Chatillon-Commentry Society has obtained through adjudication the furnishing of the ironclad Sheet Steel at the price of 105.50 francs. This contract they look upon as a satisfactory one. The great Iron works in the district have renewed their contracts for the obtainment of Algerian Iron ore with the Mokta-el-Hadid Company. The rolling mills in the Ardennes are actively engaged; the founders have also received orders. *Coal.*—In spite of the revival in Iron industry, Coal does not yet quite show a favorable reaction except in a few localities, such as the Loire district. But this will, we dare say, soon undergo a satisfactory change for the better.

BELGIUM.

(Revue Universelle).

BRUSSELS, Aug 19, 1877.—*Iron.*—In Belgium the stocks of "affinage" Pig Iron are still heavy. Old Rails still abound, since the railroad companies tear them up in large quantities in order to replace them by steel ones. This week on 'change day the holiday has kept our exchange closed, but in any event little business would have been transacted. Prices have not yet commenced to look up, although our works cannot precisely complain of a lack of orders. On the 9th instant an adjudication was held at Milan, Italy, for the furnishing of 5000 tons Steel Rails, which was awarded to the Union Society of Dortmund at 182.50 per ton, the Belgian offerings having been 189.87 by the Cockerill Company, and 195 by the Angleur Steel Works. The Acoz forges have just started their rolling mills for the turning out of large widths of sheets. *Coal.*—Charleroi quotes 10 to 11 francs. Our government encourages the Westphalian mines to enter into competition with English Coal for navy use.

GERMANY.

(Borsenhalle).

HAMBURG, Aug. 18, 1877.—*Metals.*—The metal trade during the week has shown symptoms of a slight revival in various quarters in Germany, and the outlook is becoming a little more cheerful. We have on various occasions invited attention to the fact that stocks in the hands of the trade and consumers are by no means large, and that circumstances half way encouraging toward the reopening of the fall campaign would induce both these classes of buyers to come forward more resolutely in view of the really much reduced prices of metals. A bountiful grain crop in Germany, and a good demand for metals for Russia, now favor greater activity during the autumn months, and confidence is awakening by degrees; hence we hope that from now forward our reports will lose much of their previous monotony. *Copper* has been more lively, without, however, leading to a rise in value. Berlin is moderately active at 76 to 78 marks the 50 kilos. for English and Australian. We are unaltered here, our quotations being the following ones: Drontheim, 80 marks the 50 kilos.; Minnesota Ingot, 100; Quincy, 88, and English Tough Cake, 75 to 76. *Tin.*—Our markets have virtually become paralyzed in consequence of the drooping tendency at London and in Holland. At Berlin, Banca is now down 74 to 74.25, and English 72.50 to 72.75 marks the 50 kilos. Nothing can be reported from here. We quote Banca 74 to 75, and English 74 to 78. *Lead* has been in a rather apathetic condition both at Berlin and here. Berlin quotes Tarnowitz, Hartz and Saxonian, 20.25 to 20.75 marks the 50 kilos.; here English is offering at 22.50 to 23 in pigs, and at 23 to 23.50 in Sheets; German pig is worth 22.50 to 23, and Spanish 25. *Spelter* has at length entered upon a course more promising for the holding interest, the usual consumers and operatives showing greater willingness to take hold of it, resulting in a firmer attitude of the markets. At Berlin good qualities Silesian command 19.50 to 20 marks the 50 kilos.; at Breslau the "Hohenlohe" brand is bringing 18.20, and "Godulla" 18.35. Here we remain nominal at 20 marks to arrive.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, Aug. 21, 1877.—*Tin.*—The market is weak, notwithstanding the little pressure to sell exercised by holders. Banca, on the spot, is being done at 40 to 40.50 guilders the 100 kilos., and more may be had at the same figure. Billiton is nominally 39. Banca, to arrive, since sold at 40, and Billiton, landing, at 38.

EAST INDIES.

(Gilfillan, Wood & Co.)

SINGAPORE, July 1, 1877.—*Tin* has varied little during the fortnight, and is worth to-day $19.42½ per picul. The supply continues under the average, and we do not look for any present increase. *Tonnage* is in ample supply. The Annie Reed is loading for New York at £2 per ton for dead weight. The Mallard has sailed for the same port, having on board 838 piculs Tin. The Game Cock loads for Boston. *Shipments* from the Straits Settlements to the United States since January 1: 29,818 piculs, against 21,593 in 1876; 27,873 in 1875; 20,330 in 1874; 16,281 in 1873; 25,936 in 1872; 30,092 in 1871; and 34,074 in 1870. *Exchange* is firm at 4/1⅝ per dollar, six months' sight credits.

(Aitken, Spence & Co.)

COLOMBO (Ceylon), July 7, 1877.—*Plumbago* is quiet, but owing to recent floods, supplies are small. We quote: Lump, cleaned, including packages per ton and duty, free on board, with commission, 336/; Chip, 189/; and Dust, 131/3; freight to New York, 60/, exchange being calculated at par. The shipments to the United States since Oct. 1, 1876, have been 65,252 cwts., against 45,652 last year; to the United Kingdom, 21,342; to Marseilles, 348; and to the remainder of continent and Australia, 110; together, 87,052; against last year, 100,891; in 1875, 79,619; and in 1874, 127,291. The Coniscliffe is reported fixed to load for New York. *Exchange.*—1/9¼ to 1/9⅝, six months' sight on London.

(Clark, Spence & Co.)

POINT DE GALLE (Ceylon), July 21, 1877.—*Plumbago.*—The Arab Steed removes 200 tons, chiefly on native account. There are no transactions to report. *Coal.*—The Estrella proceeded to Manila with her cargo of 800 tons Cardiff. No other seeking cargo has arrived since. *Exchange.*—1/9⅝.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, Eng., Aug. 20, 1877.

THE YEAR PROGRESSES

very rapidly, as Time has ever done, according to the popular tradition of that ilk, and still the long-looked for revival of trade has not come about. In the early part of the vernal quarter we were somewhat sanguine that there would be a better state of things by the fall of the leaf, but spring passed and summer came in all its glory, yet we heard of no amelioration of our industrial condition. Now we are fast gliding into autumn, with all its manifold natural beauties, but still we see no material improvement. A few weeks ago the weather was brilliantly fine. Since then it has been broken, with abundant showers and frequent thunder storms, facts which have caused much uneasiness to those who build their hopes at this season for the most part upon the successful ingathering of the British corn growth. The wheat crops are a very fair average in all the great corn-growing counties, and of oats the growth is more profuse than I remember for some years past. In the Southern and South Midland districts the harvest has been well got, but in the northern parts I am afraid the cropping must inevitably be greatly deteriorated by these persistent rains. I suppose I hardly need stop to say that the reaping machine is everywhere in use, so that with but a few fine days large breadths of corn can be secured, whereas I very well remember large farms on which, in bygone years, 200 to 400 Irish shearers, with hook or sickle, were employed for three or four weeks in harvesting. From these facts generally it is inferred that we cannot build largely upon our harvest, yet we may rely upon it as being a sound integer in our customary reserves at this time of the year, and as being of such a nature as to afford the hope that the home trade will be fairly stimulated thereby. In other respects I cannot report at all hopefully of commercial matters, although some business men of my acquaintance are inclined to believe that an improvement is now being slowly inaugurated.

THE BRITISH ASSOCIATION

opened its session last Wednesday at Plymouth, and still sits there in incubation of various more or less ingenious theoretical speculations. The address of the President, Professor Allen Thompson, was an exclusively biological speech, and dealt in a very interesting manner with what he termed the "Development" theory of creation, which is precisely the same thing as the doctrine of Evolution, as preached by Huxley, Darwin, Herbert, and any number of continental scientists. The President, in fact, after explaining mesoderms, hypoderms, blastoderms, protoplasms, and so on, openly avowed himself a thorough Evolutionist, and said that the study of embryology could lead to no other conclusion. In the sections, many interesting papers have been contributed, particularly in the Mechanical and Geographical sections, although in one or two instances the theories put forward were of the most wildly visionary and purely hypothetical nature. Next year's meeting will be held at Dublin, in 1879 at Swansea, and 1880 at Nottingham.

THE LABOR QUESTION

in many parts of the country is now assuming awkward phases, and in a couple of instances may deepen into strikes or lockouts of very serious proportions. This is the case in South Staffordshire and East Worcestershire, where the whole of the associated coal masters, on Tuesday last, decided that all contracts should be terminated on August 31, and that thereafter the wages should be rearranged on the basis of lengthening the day's work and abolishing perquisites. The men resent this step, and at various mass-meetings throughout the districts have declared that they will strike and hold out any length of time rather than work more than eight hours, as at present. About 40,000 colliers alone are affected by the notices. In the Lancashire cotton mills shorter time has been inaugurated and is fast becoming general; in fact in the Oldham and Bolton districts an additional reduction of 10 per cent. is proposed, but resisted by the work-people. At Dundee, the factory operatives are on strike in opposition to a drop of 5 per cent., but the masters are determined to persevere. The Fife and Clockmannan miners have empowered Sir Robert Anstruther to negotiate for the settlement of their wages dipute. The Clyde shipbuilders have also expressed their willingness to go to arbitration in order to settle their disastrous dispute. At Ebbw Vale iron works the men have agreed to reductions varying from 5 to 15 per cent., and at several Bessemer steel works, near Sheffield, notices have been given of a drop of 10 per cent. In London only 1000 masons now remain on strike, over 700 having been re-engaged, or having migrated. In Manchester the carpenters' immigration excites much attention.

THE FAILURES

of the past seven days, although not excessively numerous, have been rather heavy, the principal stoppage having been that of Messrs. Eccles Shorrock, Bros. & Co., spinners, &c., of Over Darwen, near Manchester, with debts amounting to over £110,000. At Birmingham circulars have been issued convening a meeting of the creditors of Mr. William Watts, trading as B. H. Harris & Co., of the Parade, Birmingham, metal rollers and merchants, whose liabilities are £80,000. A preliminary meeting is also called of the creditors of Messrs. Crabtree Brothers, carpet and rug manufacturers, of Kidderminster, who owe £46,000. At West Bromwich, Isaiah Kendrick, boiler manufacturer and colliery proprietor, has stopped payment, owing £30,000. At Sheffield, Thomas Harris, manufacturer of plated goods, cutlery, &c., has filed a petition for liquidation, owing £6000.

THE COLORADO BEETLE

has been captured during the week at Liverpool, at Bristol and at Glasgow, but he seems so ubiquitous that the Privy Council have got out special "minutes" about him, and prohibit the bringing of potato haulms, straw packing, earth, &c., from the States.

THE MERSEY STEEL AND IRON COMPANY,

near Liverpool, has capital facilities for shipments, yet its annual report, just issued, says: "Your directors regret that the operations of the past year show a loss of £13,761. 1/3. They therefore are unable to recommend the payment of a dividend. This result is due to the long-continued depression in the trade, but especially in the manufacture of Bessemer steel rails, the forgings for the twelve months showing an increase over the previous years both in weight and value. The sales during the year amount to £238,110. 13 4." This exemplifies the present profits of the British rail trade.

THE PELSALL IRON AND COAL COMPANY'S

shareholders met at Birmingham last week to hear the report of the Committee of Investigation, which recommended the removal of the managing director and two other directors, the election of additional directors and a call of £3 per share. The managing director, Mr. Boaz Bloomer, issued a counter report, and in the end was re-elected a director, although he declined to resume the management. The meeting was "warm" throughout.

THE PATENT SHAFT AND AXLETREE COMPANY'S

report shows a net profit of £23,051, of which preference share interest absorbs over £17,000, leaving £6000 odd for dividend, to pay which £9000 is also taken from the reserve fund, the division being at the rate of 5 per cent. per annum.

SCOTCH PIG IRON

has been fairly steady during the whole of the week, and makers' quotations have been well upheld. There are now 84 furnaces in blast in Scotland as compared with 115 at the same period of last year. Despite this restriction of production, however, 1991 tons went into store last week, the total now held by Messrs. Connal being 154,080 tons. It is probable that this and succeeding weeks' stocks will not largely increase. Freights are quiet to your ports at 2/ New York; 9/ Boston; 5/ New Orleans; 8/ Baltimore; 8/ Quebec; 7/6 Philadelphia; 10/ Montreal and 9/ Providence.

Writing from Glasgow August 17th (evening), James Watson & Co. said: Since the date of our last report the market for Scotch pig iron has been steady, prices ranging between 55/7½ and 55/3, cash, closing this afternoon at 55/5, cash. Makers' iron keeps firm. Shipments last week were 7321 tons, against 7658 tons in the corresponding week of 1876. We quote:

	No. 1.	No. 3
G. M. B., at Glasgow	56 9	53/6
Gartsherrie, "	63 6	55/6
Coltness, "	68/6	56/
Summerlee, "	60/6	55/
Langloan, "	64/	55/6
Carnbroe, "	57/6	54/
Calder, at Port Dundas	61/6	54/
Glengarnock, at Ardrossan	60/6	55/
Eglinton, "	56/6	53/
Dalmellington, "	56/6	54/
Shotts, at Leith	61/6	56/
Kinneil, at Bo'ness	57/6	52/6

Messrs. Wm. Colvin & Co also report a steady business and the continued firmness of makers' brands.

The prices current of John E. Swan & Brothers, August 17th, gives the following figures:

Gartsherrie, No. 1	62/6
Coltness, "	68/
Glengarnock, "	60/
Eglinton, "	56/
Ballast Pig iron	47/6

LAST WEEK'S FIRES

were numerous but not alarmingly serious. At Thornliebank, near Glasgow, the calico print works of Messrs. Crum & Co. were partially destroyed, the damage being set down at £30,000. At Greenfield, near Hamilton, Scotland, the saw mills, &c., of Mr. Buchanan were destroyed, the damage being very heavy, but not definitely ascertained. At the Queen Colliery, Pemberton, near Wigan, a feeder of gas became ignited by the firing of a shot, and in turn set fire to the coal in that part of the pit. There were 350 miners in the workings at the time, but all escaped unhurt.

THE RAILWAY ACCIDENT SEASON,

always due about this time of the year, has just set in with many of its accustomed features. For many years I have noticed that the advent of August brings numerous accidents all over the country, and this month is no exception. On one day last week there were four or five accidents in different parts, but although many passengers were injured, none, fortunately, were killed. There were narrow escapes nevertheless.

TRADES OF SHEFFIELD.

The general condition of trade hereabout remains in much the same sluggish and unsatisfactory state as of late. In hardly any single branch of industry is there any prospect of an early improvement, nor do the most careful inquiries show that the amount of business in hand is anything like an average. The increased home competition may have something to do with this state of things, inasmuch as in one or two departments the aggregate production is up to the average, although every individual instance is palpably below that level. The changes of the local market during the week have been few, and not of great importance. So far as pig iron has been in question, there has been a tolerable firmness manifested by smelters and agents, but buyers have not been eager to get hold of large lots for long forward dates at higher figures than those now current, as quoted in my last week's communication. Foundry brands have been, perhaps, in the steadiest request, some of the Barnsley and other foundries being fairly occupied on orders for colliery plant and general castings. The pig iron market cannot at present be said to be lively, yet such confidence is evidently felt in the future that at the Sheepbridge Works two new blast furnaces, of very large size, are in course of construction, and another is likely to be put up shortly, which will make a total, in one "row," at the establishment, of ten furnaces. At one of the finished iron works there has been a little more business doing during the past week, mostly on account of shipping orders for ordinary bars, hoops and single sheets. At one local establishment, too, there is a good amount of work in hand on account of an order from the Midland Company for fish plates rolled from iron of good quality. Generally speaking, nevertheless, the merchant trade is very quiet, the consumption being clearly at its very lowest ebb. Nothwithstanding this state of things, there are many extensions and improvements of works in hand throughout the district, and a few new places are being erected here and there, some at Sheffield, one near Rotherham, another north of that place, and one near Barnsley. These signs may be taken as indications of confidence in the future, and as an earnest of an even more lively competition than that already in existence. There is no change of any importance to note in connection with the steel rail trade, or in any particular affecting the production of railway requisites. There is a poor inquiry for springs, so that there are some hundreds of spring-fitters either wholly out of work or on short time. For patent buffers there is a moderate call, and for tires—particularly large ones for locomotive driving wheels—the demand has lately somewhat improved, mostly on home account and for the Indian lines. For the East Indian lines a heavy order for axles has recently been executed by John Brown & Co. (Limited), of the Atlas Works, Sheffield.

In the armor-plate forges and mills there is a fair amount of work in hand, yet by no means such a tonnage as has frequently been seen during a time of peace. Our own and other governments, in fact, appear to be waiting and suspending their orders until the result of a naval engagement between the Russian and Turkish ironclads is seen. At the gun works, too, there is no special activity, the men there being still on four days only weekly.

In the cast steel trade quietude is the rule, the best part of the business now doing being on account of the deliveries for the use of the local cutlery and tool manufacturers, and for the country markets. Lancashire and the Birmingham districts are not bad customers, and some of the Scotch towns yield a number of small orders. The foreign trade remains dull, particularly that of the United States. The discontent of the employers with the nine hours' system continues, and at the works of H. & S. Barker (Limited), Mexbrough, the whole of the workmen have received notices, to expire August 25th, terminating contracts, prior to an effort to reduce wages. At the Yorkshire Steel and Iron Works, at Penistone, belonging to Charles Cammell & Co. (Limited), of Sheffield, the men have been served with notices of a reduction of 10 per cent., a drop, which, it is stated, the men are disposed to accept.

The half-yearly report of the Sheffield Tramways Company shows a profit of £1268, yielding a dividend of 5 per cent. per annum, and states that the construction of the Heeley and Nether Edge Lines is being rapidly proceeded with. The half-yearly report of the Leeds Tramways Company shows a balance of £3495, yielding a dividend at the rate of 3½ per cent. per annum, and states that parliamentary authority has been obtained for various extensions. The half-yearly report of the Sheffield Wagon Company (Limited), alludes to the great depression of the iron and coal trades, shows a balance of £3197, and recommends a dividend of 8 per cent. per annum free of income tax. The fifth annual report of the Sheffield Forge and Rolling Mills Company (Limited), shows a loss of £1628 on the year's operations, which is, however, an improvement on the preceding year. The annual report of Samuel Fox & Co. (Limited), Stocksbridge Works, Sheffield, shows a profit of £24,610 for the year ending June 30th, a result which the directors deem very satisfactory in the present state of trade, and justifies a dividend of 10 per cent. They add that the prospects of trade warrant the expectation of only very moderate results from the operations of the current year. The Stocksbridge Railway is now open for the company's traffic, and will shortly be available for passengers.

In cutlery, saws and files, there is little change, and only a limited business doing.

THE STAFFORDSHIRE AND BIRMINGHAM

iron trades remain unchanged, and with little new business during the week. Prices are, in the main, rather favorable to buyers, but in the best brands there is no official change. A few of the leading firms continue to be fairly busy on best sheets, constructive ironwork, plates for boiler and dock-yard purposes, and galvanized sheets for Australia, India, Chili, Brazil and the Cape. In ordinary merchant iron there is no movement whatever, the demand for all kinds thereof being on a most limited scale. Ordinary marked bars remain at £8 to £9; unmarked bars, £6 to £7; nail rods, £7.5 to £8.10; plates, £8 to £9; single sheets, £8.5 to £9; angle iron, £7 to £7.15; boiler plates, £9.10 to £10; ditto best, £10 to £11; best best, £11 to £13. In the hardware branches there is a moderate amount of work in hand, but all orders are the subject of immensely keen competition. Brass work prices are easier; iron hinges are lowered by 2½ per cent. more dis.; frying pans are 7½; wall nails, 10/ per ton; patent nails, 7½, and iron frame pulleys, 10 per cent. lower. There is a fair amount of business in the birding gun, electro-plate, telegraphic wire, edge-tools, railway rolling stock, gas fitting, metallic bedstead, harness, saddlery, and some few other departments. The jewelry, iron tube, military gun, and other branches, remain depressed.

SOUTH WALES AND MONMOUTHSHIRE.

The iron and steel trades of these localities remain quiet, only two or three of the leading establishments being by any means fairly employed. It is stated that at Ebbw Vale last week 1600 tons of Bessemer rails were produced, which is said to be the largest make yet accomplished in the district. At Blaenavon rather more work is doing. The debenture holders of the Plymouth Iron Works are asked to subscribe £800,000 to carry on the collieries, and of this one Scotch firm is stated to have put forward £500,000. Last week's exports of iron from South Wales were 5234 tons—bars for Lisbon, rails for Canada, Gothenburg and Westruch. During July, Newport and Cardiff exported over 16,000 tons of iron. Last week's coal exports fell to 60,000 tons only. Tin plates are quiet all round.

THE METAL MARKETS

have been very quiet and no special business has been transacted.

Messrs. Von Dadelszen & North report: "*Copper* quiet. The Chili charters for last half of July are telegraphed as 1400 tons, and for first half of August as 1200 tons. Chili bars are generally held for £69. Small sales of G. O. B. have been made at £68. 10/ and £68. 15/; named brands from £69 to £69. 15/. Australian firmer; small lots of Wallaroo cake at £80 to £80. 10/; Burra, £75. 5/; English tough, £74. 10/ to £75. 10/; select, £76 to £77; sheets, £81. The Swansea ticketing on Tuesday realized an average of 11/8¼ per unit for 8 13-16 produce. *Tin* flat and lower. Straits sold at £65. 10/ to £65, and Australian from £65 to £63. 15/ on the spot, and at £63. 10/ for parcels landing. Dutch market flat; Banca, 40½fl., and Billiton, 39fl. The Billiton sale in Java, on the 13th, went at an average of 42.32fl. per picul, equal to about £65 per ton in Holland. English ingots, £69 to £70. Bar tin, £70 to £71. *Tin Plates* dull. *Lead* flat; £20 to £20. 5 for English pig, and £19. 15/ for soft Spanish. *Spelter.*—Little doing; £19. 5/ to £19. 10/ for ordinary brands. *Sheet Zinc.*—Of 150 tons in public sale only 120 tons sold at £23. 15/ net, being 5/ decline. *Quicksilver.*—The importer of Spanish has reduced his price from £9. 10/ to £9; but second-hand parcels have been sold at £8. 10/. *Antimony*, £48 to £49."

Official report of the London Lombard Exchange: "*Copper* quiet; G. O. B. Chili bars at £68. 10/ to £68. 15/ on the spot; 50 tons, three months prompt, sold at £69; Wallaroo, £80 to £80. 10/; Burra, £75. 5/; English tough, £74 to £75; best selected, £76 to £77; strong sheets, £80. 10/ to £81. *Tin.*—Little doing; Straits quoted at £64. 15/ to £65; Australian, £63. 10/ to £64; English ingots, £69 to £70. Scotch pig *Iron*, 55/3 to 55/4½. *Lead*, £20 to £20. 5/ for English pig; soft Spanish, without silver, £19. 12/6 to £19. 15/. *Spelter*, £19. 5/ to £19. 10/ for ordinary brands. *Quicksilver*, £8. 10/ to £9 for Spanish. *Antimony*, £48 for star; steady."

Messrs. French & Smith report: "*Copper* quiet; Chili bars, £68. 10; Straits, £64. 10/ to £65; Australian, £63. 10/. *Lead* dull; English, £19. 17/6; Spanish, £19. 15/."

The *Mining Journal* remarks: "It is becoming more and more apparent every day that a considerable time must yet elapse before any general recovery in trade can take place, and, if we may venture to express an opinion, we should say it will not be this year; and as there is no reason for expecting that the metal trade will form an exception to other markets, a period of inaction seems to await us. *Copper.*—The market keeps very quiet, but fairly steady, and for Australian prices have been quoted slightly higher, but the great difference between Wallaroo and Burra, to which we have in previous reports referred, has not yet been properly adjusted, and it is most extraordinary that buyers should be so dilatory in availing themselves of such a considerable advantage which Burro shows over that of Wallaroo. *Lead.*—The market is inactive and prices easy. *Quicksilver.*—Sales have been made at various prices, and owing to second-hand parcels waiting to be realized, the market has been weak; from importers it has been obtained at £8. 15/, but considerably less from other sellers. *Tin.*—The downward tendency which we stated last week to be the course of the market has again made further progress, and our markets have been greatly disturbed on account of the price giving way at a quicker rate than what it was generally anticipated."

There is no change in metals at Liverpool, where matters are so quiet that merchants have discontinued at present the issue of price lists and circulars.

Iron, f. o. b. in Liverpool, per ton.

	£ s. d.		£ s. d.
Merchant bar	6 10 0	to	6 15 0
" in Wales	6 0 0	to	6 5 0
Staffordshire	7 0 0	to	9 15 0
Hoop	7 10 0	to	8 10 0
Sheet	8 15 0	to	9 15 0
Nail rod	7 0 0	to	7 10 0
Bar, best crown	7 0 0	to	8 0 0
Boiler plates	9 0 0	to	10 0 0

Tin Plates, f. o. b. in Liverpool, per box.

	£. s. d.		£ s. d.
Charcoal, I. C	1 2 0	to	1 4 0
Coke, I. C	0 18 0	to	1 0 0

Copper, delivered in Liverpool, per ton.

	£ s. d.		£ s. d.
Bolt and sheathing	82 0 0	to	0 0 0
Tile	75 0 0	to	0 0 0
Tough cake	76 0 0	to	0 0 0
Best selected	77 0 0	to	0 0 0

Dr. Townsend Austen, of the New York School of Mines, communicates to the *Chemical News* the fact that felt base-pads are very effective in protecting glass vessels containing hot liquids from fracture. He cuts up the felt (about one-half inch in thickness) into oblong pieces, in sizes from 2 by 4 to 8 by 12 inches, and he makes it a practice to have a pad under every glass on his laboratory table. He also gives a useful plan to obtain well defined crystals from solution: Having evaporated the solution to the proper consistency in a watch-glass, he warms another watch-glass, places it, but does not press it, on the top of the former one, and the drop expands to a film a little thicker than that obtained in an animalculæ cage. Crystallization takes place between the glasses when a drop or two of ether is permitted to evaporate on the surface of the upper glass.

Shall the Apprentice System be Restored?

Under the Trades' Union system the right of the rising generation to learn a trade had been practically taken away; or, where it is conceded, the concession is clogged with such harassing conditions to the employer as to make it all but worthless. Thus, in manufactories, shops and other places where skilled labor is required, a certain number of apprentices are "permitted," in proportion to the number of journeymen employed. The owner of a shop or factory, with all his capital invested in it, might have a number of sons whom he might desire to learn a trade there, but unless the numerical proportion of boys to men were adjusted to the dicatorial prescription of the trades' union, the proprietor would be unable to accomplish his wish. Straightway the journeymen, working in connection with them, would object, and the objection would have to be respected, or the hands would quit work and bring the business to a dead halt. Preceding the adoption of this arbitrary system of exclusion, the old-fashioned indenture plan was abolished—a plan which obliged apprentices to serve a term of years at their particular handicraft, thus enabling them to obtain a thorough mastery of its art and mystery. It was under that plan that the country was enabled to procure at all times thorough, competent workmen, and to provide for the American lad a means of earning his own livelihood which would always stand by him. The trades' union people, however, got it into their heads that if they could only destroy the apprentice system they would be able to reduce the supply of available skilled labor, and therefore to command better prices for their own. The history of the past twenty years, during which this process has been going on, shows how persistently the idea has been carried out, and the result is, what it is. An American boy who thoroughly knows a trade nowadays is a *rara avis*. Even such as have been permitted to acquire that advantage are found to be only half taught, the abolition of the indenture system resulting in a frequent changing about and resistance to that steady, persistent application which is indispensable to thorough work and thorough workmen. We have had occasion to show time and again that to make up for this deficiency we frequently have had to send to Europe for skilled artisans—men who knew not a part of their trade, but the whole of it. We are informed on good authority that a majority of the journeymen shoemakers, hatters, carpenters, cabinet makers, bookbinders, jewelers and tailors in New York to-day are Germans, English, French and Irish, and what is true of New York we are inclined to think will hold good with reference to other communities. The fact is the race of American mechanics and artisans is dying out, and that is one reason why European communistic notions have been so conspicuous among the laboring classes of late years. When the American element preponderated among them these notions were unknown; but the American element being gone, the socialism of Germany and the communism of France, left to themselves, naturally effervesce and come up, as they have recently come up in organized strikes, to the surface. The short-sighted trades' unionists in all this certainly have not succeeded in increasing wages. They have killed off the American mechanic and artisan: but if their own acknowledgments are worth anything, the condition of the laboring classes to-day is infinitely worse than it was before the experiment was undertaken 20 years ago.

But what then is become of the American youths who have thus been turned adrift to shift for themselves? We have the sad answer in part in the annual reports of our State prisons and penitentiaries, and in the constant additions that are making to the great army of tramps that infest the country in every direction. That of the Eastern (Pennsylvania) Penitentiary, just published, presents some statistics bearing upon this point of startling significance. Among the tables is one showing the industrial relations of the younger prisoners committed to that institution during the years 1874, 1875 and 1876. The total commitments of persons under 25 years of age were 432, and of these but 106 had an occupation of any kind; the remaining 326 had neither occupation nor trade. They had drifted along to manhood with no regular means of self-support, with no aim or object in life, until they found themselves among those who call themselves hucksters, peddlers, teamsters, waiters, 'longshoremen, boatmen and others of "no particular occupation," gradually descending thence into voluntary or involuntary indolence and vice until they were landed in the penitentiary. Out of 230 prisoners under 25 years of age committed to the penitentiary last year, but 47 had worked at any skilled trade or occupation that required training or long service to master. The prison inspectors use very earnest language to impress the lesson it teaches upon the Legislature and upon the community at large. They point out that the education placed within the reach of all by our school system is of no avail unless it be accompanied by that sort of industrial instruction and training which aids in fitting young people for skilled labor or callings and enables them to have regular occupations. They hold it to be incumbent upon the Legislature to see to it that school education is supplemented in some way by industrial instruction and training in those pursuits we call trades. Certainly the fact that three-fourths of their young prisoners have "no regular trades or occupations" should be sufficient to startle both the public and the Legislature into thought and action. For our part we have but little faith in the efficacy of legislative interference in the matter, beyond compelling the trades unions to retreat from their present unjust and tyrannical repression of the apprentice system. This ought to have been done long ago. Let it be insisted upon now.

We repeat, it is well enough for the workingmen all over the land to be organizing to obtain what they call their "rights"—no one can object to that—but unless they desire to be themselves stigmatized as the worst sort of monopolists, let them respect the rights of others. Let them restore what has been wrongfully taken from the youth of the country—the right to learn a trade. We do not know that anything beyond that is necessary. Our handicrafts will then be freed from the shackles that have been placed upon them, and we shall get our full supply of thorough, trained American labor back again. Industrious mechanics will take the place of tramps. Vagrancy will diminish. We shall have altogether better work and better workmen. There will be an end of halfway journeymen and less occasion than there is at present for imposing new burdens upon the taxpayers for building and maintaining State prisons and penitentiaries.—*N. Y. Bulletin.*

Alvin Adams, the Founder of the Expr. ss Business.

The New York *Sun*, in a recent issue, has a number of very interesting reminiscences of the late Mr. Alvin Adams, the pioneer in the "Express" business of this country. In 1840 Mr. Adams was not worth a dollar. Last week his express carried in one day $27,000,000, the security for which was simple receipts. In 1840, with the assistance of one man and one boy, he did what little there was to do. To-day the concern of which he was parent employs nearly 15,000 persons. Mr. Adams was one of the few of whom it might be said, "He was one of the most remarkable men in the country." Like Vanderbilt and Astor, Mr. Adams started with nothing, and died leaving an estate valued at many millions of dollars. Among his earliest associates was John Hoey, who for 37 years was an intimate, and at Mr. Adams' death stood high in the councils of the company. On the eve of his departure to attend the funeral Mr. Hoey was asked to give some reminiscences of Mr. Adams and the early days of the great enterprise he began. In reply, Mr. Hoey said: "I would be glad at some other time to tell you the facts of this romance, but I am hurrying off to Boston. When Mr. Adams began to carry parcels and letters between Boston and New York there was no railroad. He came to Allyn's Point and thence direct to New York. He had a singularly pleasant face and a frank, manly bearing that attracted people and bred confidence, so that he soon got his share of that kind of patronage.

"He traveled himself a short time only. Then he hired messengers, but his personal bearing and genial manner did much to win customers. It was everything in fact. After a few months he induced a young harness maker named Dinsmore to come to New York and open an office. He did so; and at first he kept the books, delivered the letters (for which they got 25 cents each) and the parcels, made out the way-bills, and collected the freight.

"At that time I was a cabin boy on the Sheridan, a packet between New York and Liverpool. I got in with a gang of boys, and in a short time we five made a corner in counting papers. We counted, mailed, folded and shipped all the papers printed in the city. Mr. Bennett took a great fancy to us. One of us was Jerry Bryant, the minstrel. While I was doing this I made the acquaintance of an expressman named Beecher. He was running a little Connecticut express, and offered me $4 a week and steady work. I accepted, and we took an office with Adams. At that time Edward S. Sanford was in the habit of coming in and asking for a job. Finally Dinsmore let him help to make out a way-bill, and little by little he worked in, till he was made agent in Philadelphia, and Dinsmore and I ran the New York end, Adams staying in Boston.

"Mr. Adams was the chief, and he was the sole one known, too. He and his manner made everything.

"At first we were not successful. It was 1846 before we began even to see our way clear. It was a constant struggle. A $3 way-bill was a wonder."

At first bills and letters were the principal freight, but parcels began to come in, and, after a while, trunks, boxes and bundles. This necessitated a porter, but for a long time a boy and a wheelbarrow did all the collecting and distributing. Then they got a horse and wagon—a step which was pondered long before it was taken. All the parties interested were fond of horses. Mr. Adams had in early life looked forward to the day when his ambition would be crowned as he took his seat upon the box of a stage, with the ribbons of a four-horse team in his fist. Mr. Dinsmore, as a harness maker, was brought in contact with horsemen, and knew about horses. In late years Messrs. Adams & Sanford have been noted for their stables, and have held the reins over the best blood in the land. With the purchase of the horse and wagon came a new field of operations. The New York and New Haven Railroad, just then completed, offered them facilities and exclusive contracts for carrying money and small packages in what was known as a P. P. truck over its line. For this Adams & Co. contracted to pay, with fear and trembling in their boots, the enormous sum of $1700 a month, but almost at the very start it proved a paying venture—indeed the venture which determined them to continue in their business. The next step was to carry freight for merchants at either end of the line, and to establish agencies along the route as well; and in less than three years the whole custom of the country was changed, almost all the light freight and some of the heavier being sent by railroad express, instead of on the boats as freight.

The government was not slow to follow the example of the banks and merchants, and sent for Mr. Adams to go to Washington. He went and made so good an impression that a contract was at once entered into by which the company were to carry over all their lines the government treasure. When the war broke out this duty meant much more than in ordinary times. Millions were sent by Adams & Co. every day all over the continent; sometimes millions in coin, sometimes in bills or bonds. At times they had armed guards to protect the treasure, but as a rule the government agent took the company's simple receipt and sensibly left the rest to the agents.

When the California fever broke out in 1849, Mr. Adams was first in the field, and sent out an express under Mr. D. H. Haskel, one of the keenest men in the service. He took out a wooden shanty for an office, and soon made the place headquarters for all the wise men of the East. Those were golden days. The trouble, exposure, risk, danger and cost of running an express to San Francisco and thence to the interior can never be known by hearsay. The messengers were honest, for they carried millions safely. Attacked by robbers, caught in turbid streams, tempted by new diggings and harassed by hardships and fatigues, they did their devoir like heroes. After the express had been doing finely, in an evil day they opened a bank. When Mr. Adams went to San Francisco the whole town rose at him. He went to inspect, but he had no time for that. He was wined all day and dined all night. He was carried from point to point in a carriage drawn by four horses and treated like a prince. When he got back he said he didn't know whether he was Alvin Adams or the Great Mogul. At all events, he knew he hadn't done what he went to do. Express charges at the East were moderate; in California they were outrageous. Letters, daguerreotypes and small packages from loved ones at home went out at extortionate rates, because of the danger and the risk. Ten to one if the consignee ever saw the freight which went in the wild rush for the land of gold. Later, system and regular service ruled. During the great financial scare the California branch of Adams & Co. went under. Fortunately, the business here was in different shape. A stock company was formed with a capital of $1,000,000, called the Adams Express Company, and as the business had assumed colossal proportions Mr. Adams, who was seriously crippled by the California failure, was not many years in extricating himself by the dividends accruing to his share of the stock.

Mr. Dinsmore graduated from the happy-go-lucky harness maker into the president of the company. That position he still holds, as he does a large amount of the stock. Mr. Hoey, who used to count newspapers and deliver letters, was made superintendent of the great establishment. Mr. Sanford, whose eager pleadings for a job enlisted the sympathy of Dinsmore, has left off bill sticking. He was for a long time agent in Philadelphia, then turned his attention to the American Telegraph Company, then the Western Union, and still lives a very rich and fortunate man.

Mr. Adams married in the East, and as money came in developed, as indeed they all did, a fondness for the æsthetic, which was most marked in the direction of pictures and statuary. His place near Boston is spoken of as one of the wonders of that wonderful part of the country. A magnificent house stands in a beautiful park, filled with rare and costly works of art, purchased by their owner at home and abroad. His family was greatly attached to him, as he was to them. His oldest son, Alvin, Jr., was in his father's office, but died young. Waldo is the present Boston agent, and bids fair to worthily represent the tact and talent of his father. Necessarily New York became the head center of the business—a distributing point. Mr. Adams early foresaw that this would be the case, but nothing could induce him to leave Boston. He came on frequently to see that everything was right, but he was glad to get away and glad to get on State street again. A more genial man never lived. He saw all who called on him. He did good all his life, giving most generously of his bounty. His clerks and men were proud and fond of him. He cared for their wants, studied their comfort, looked after their families, and when he gave advice gave money with it. In many social respects he was a model man. As the founder of a unique business he was sagacious; as a business man he was honest and successful. His death is lamented by the merchants of Boston, with whom he was associated intimately nearly forty years, and whom he served with fidelity and promptness.

Quick Railroad Building.

A writer in the *Engineering and Mining Journal* gives some very interesting particulars in regard to some very rapid railway building which has been done within the year.

The Philadelphia & Atlantic City Railway, three and a half feet gauge, is fifty five miles in length, and has recently been opened, having occupied but three months and seven days in construction. Ground was broken April 1, 1877, and the first train was run over the road July 7, when one and three-quarter mile of track was laid in advance of the train, delaying it two hours. The following particulars show that the rapidity of construction was due to remarkable energy on the part of the consulting engineer, Mr. Theodore F. Wurtz, and not to unusual facility.

The deepest cut on the line is 30 feet; deepest fill, 35 feet; largest single excavation, 40,000 cubic yards; embankment, 30,000 cubic yards. An embankment of 23,000 cubic yards, 1800 feet long, was made in one week! And five miles of track were laid in one day. There are more than one hundred bridges and culverts on the line. The longest three bridges aggregate 1300 feet in length, and one bridge has a draw of 100 feet. The road has 4400 feet of wharf in Camden, built in two months. The company has for its depots, offices, and excursion house, the Centennial buildings known as the Centennial Commission Building, Lafayette Restaurant, Board of Finance Building, Centennial Bank Building and the Car Annex to Machinery Hall. These in their light architecture are very appropriate to the requirements of a railroad built for summer travel. The average cost of grading was but ten cents per cubic yard of excavation and embankment. The equipment of the road consists of 8 locomotives, 44 passenger coaches, and 60 freight cars, and the track is laid with 40-pound steel rails. The entire cost of construction and equipment was but $770,000, or $14,000 a mile. Not the least remarkable thing in this connection is that the road was built within the original estimates of cost. Though it is not yet fully completed, when this is done according to the engineer's plans, it will be equal to our best wide-gauge roads in safety, speed, and comfort. Trains run through the 55 miles without stopping in two hours, and one train has carried 2,300 passengers each way.

The remarkable progress made in building this road naturally kept the engineer corps pretty busy, night and day work being in order; sixteen hours was an average day's work for the consulting engineer.

The road was built and the train force organized by Mr. Theodore F. Wurtz, who certainly deserves great credit for the speed and economy with which he has completed the work—we believe the most rapid example of railroad construction on record. The Atlantic division, 25 miles including the drawbridge and five miles of track laid on stringers over the salt meadows, was under the charge of Mr. J. Rowland, division engineer. The work performed is the best testimony to the ability of each and all engaged in it.

The Use of Balloons in Warfare.—It appears from the report of the result of a series of experiments to determine the utility of ballons for reconnoitering purposes, recently carried on in Germany, and extending over a considerable length of time, that, after repeated trials, a balloon was constructed that could be packed in a comparatively small space and carried about without being damaged or rendered in any way unfit for immediate use. A second difficulty arose in providing a portable apparatus capable of supplying a sufficent quantity of gas for the inflation of the balloon whenever and wherever it might be required to use the latter. But this impediment was likewise overcome, and an apparatus was designed which could generate in from two to two and a half hours enough hydrogen to raise a balloon carrying three persons. Unfortunately, however, there has been found to be yet another obstacle in the way of using balloons for reconnoitering purposes for which no remedy can as yet be devised. From the height to which the balloons must ascend, useful observations can only be made by the aid of telescopes. The balloons must, however, necessarily be 'captive,' that is, they must be confined by a rope and prevented from drifting away, perhaps only to fall into the hands of the enemy; and it is found that when there is the slightest current of air such a captive balloon begins to rotate about its vertical axis, and this so rapidly as to prevent observations being made with the necessary accuracy and detail. Consequently the conclusion has been arrived at that captive balloons cannot at present be used for reconnoitering purposes, and that, therefore, the employment of balloons in war must be limited to carrying dispatches and information.

Copper in Cast Iron.—It is well known that wrought iron containing some tenths of per cent. of copper is red-short; meanwhile in some of the best irons from Siberia was found from 0.01 to 0.03 per cent. of copper. In some specimens of steel I found 0.2 per cent. of copper; this steel was not brittle, and had been used with success for manufacturing steel axles. The presence of copper was found in several specimens of cast iron coming from the blast-furnaces of the South Oural mountains. These specimens, when examined and analyzed, showed that the presence of copper in cast iron may amount to a higher percentage in steel or iron without altering the quality of the metal. Unfortunately it is not so with wrought iron or steel. The specimen examined was much used for castings; it filled up the molds beautifully, and had a very handsome appearance; fresh cut it had a dark gray color. Under the microscope small grains of copper were easily remarked in a mass of the metal. This peculiar sample of cast iron was carefully analyzed, and the analysis gave the following average composition: Iron, 83.514 per cent.; copper, 8.123; tin 1.252; cobalt, 0.501; silicium, 0.952; tungsten, 0.125; carbon, 3.001; manganese, 2.312. Total, 99.780. While analyzing some iron samples for copper, I often used, in case only traces of copper could be detected, the following method; the specimen is dissolved in hydrochloric acid, and the copper and iron ore are precipitated by an excess of ammonia; the mixture is boiled and filtered; the blue liquor is evaporated nearly to dryness, and the resulting residue is dissolved in sulphuric acid. Into this solution a piece of magnesium ribbon is placed, which, in case of traces of copper, is quickly covered with a layer of this metal that is easily observed under the microscope.—*Chemical News.*

Reduction of Mercury in California.—The cinnabar is converted into calomel by the action of copper chloride; the calomel is dissolved in hyposulphite of soda, and sulphide of mercury is then precipitated by sulphide of sodium. The process is tedious and costly. Sieverking describes another process. He places the ground ore in casks with granulated copper, or, preferably, an alloy of copper and zinc, and agitates the mixture for twelve hours with a hot solution of cupric chloride. When a sample taken out shows the total decomposition of the cinnabar, a small quantity of zinc amalgam is added which effects the precipitation of all the copper which has remained in solution, and causes the agglomeration of that portion of mercury which had been deposited in a pulverulent state. The agitation is continued for some time; the casks are then filled with water and allowed to settle. The amalgam, which is very compact, subsides; the liquid is carefully decanted and distilled; the residue from this distillation serves for the preparation of chloride of copper for succeeding operations.

The Origin of Petroleum.—Professor Mendelieff, in the *Revue Industrielle*, has proposed a theory of the formation of petroleum in the interior of the earth. From the fact that in Pennsylvania the petroleum occurs in the silurian and devonian formations, he considers it very improbable that the hydro-carburets are the result of the decomposition of organic debris, because organic life at the period was very limited. His theory, in conformity with the hypothesis of Laplace on the formation of the globe, supposes the existence of large masses of iron occurring with inorganic carbon in the heart of the earth. Water penetrating from the surfaces comes in contact with the iron in a state of fusion and is decomposed, the oxygen combining with the iron, while the hydrogen, under the influence of the heat and pressure, combines with the carbon and produces the hydro-carbons of petroleum.

A New Kind of Cassabianca.—A boy that can stay at his post as long as there is any use of his holding it, that is not afraid of threat nor the presence of violence, and keeps his work resolutely in hand so long as there is work to do. This is what is reported of August Doudel, the brave little telegraph operator who was shut up in the Pittsburgh railroad office on the terrible Saturday night of the riot. He kept on telegraphing, doing his duty, without the slightest regard to the mob surrounding him. They could not drive him away so long as the connecting wires responded to his hand. When at last they fired the building he quietly, and with a touch of humor, sent his last message: "Fire's too hot; good-night," and got away in time, showing himself to be as sensible as brave.

The Hindoos of Edwardesabad, an important municipal town on the Punjab frontier, have lately made a surprising discovery, which may, says the *Times of India*, have serious consequences. It seems that the city well there has just been reconstructed on new principles, and that a portion of its new-fangled gear consists of India rubber fittings. When the well was ready crowds of thirsty Hindoos came and gazed a it and then went sorrowfully away without drawing its life-giving water. Days went by and the heat increased, but still the well was unused. At last the municipal committee held a meeting, and the suffering Hindoos were asked what complaint they had to make about the well. They then humbly represented that India rubber, being elephant's skin, was leather, and that so long as the water was contaminated by this objectionable substance they would rather die than drink it. No amount of argument would convince them that they were wrong. After much discussion of the knotty point, a collective letter was dispatched to a learned Pundit of Benares as to the nature of India rubber. His decision is awaited with much anxiety. Meantime the water famine continues.

Mr. Fontkowski has brought before the notice of the Physical Society of St. Petersburgh a sensitive new barometer. In this apparatus a mercury column of invariable height equilibrates almost the whole of the atmospheric pressure, and a column of petroleum oil completes the barometeric column. The barometer has at its upper end an enlarement, in which is fixed, with a plug, another tube 1.40 m. in length. The two ends of this latter tube have been closed at the lamp, but a lateral slit is made in the part introduced into the enlargement of the first tube. This slit is covered with a bladder skin, previously treated with benzine, and coated with a solution of gelatine in glycerine; it is firmly attached about the tube by its two edges. Thus the bladder forms a partition, at once flexible and impermeable, between the mercury filling the first tube and its enlargement as far as the plug and the petroleum of the second. Experiments have shown that the resistance of this partition to flexure produces a loss of pressure less than 1-60th m. of mercury. The petroleum is 15 times lighter than mercury, and does not emit vapor of appreciable tension at the ordinary temperature.

An interesting discovery has been made in Morayshire, Scotland. A company, believing that there was a rich vein of lead at Stotfield and Lossimouth, began to sink a shaft, and they soon struck rich ore. While making some other excavations the workmen came upon the walls of a house about 12 feet below the surface. The walls, built of undressed stone, were three feet thick, and the building contained large quantities of lead which had been stored there by the ancient workers of the mine. There is no local tradition which might give a clew to the solution of the mysterious "find," but it is not improbable that the working of the mine had been stopped by some influx from the ocean of the loose sand, which, within historic times even, have covered so many acres of the land near the sea of what was once called the Province of Moray. Some support to this theory is given by the fact that at the south end of the subterranean house there is a mound of sand more than 20 feet high.

The various allied industries of Great Britain, commonly classified under the general name of the engineering trade, are in a condition very much like that in which similar industries in this country find themselves. The report of the Amalgamated Association of Engineers, which has just been issued, speaks of great depression in the engineering trade. There are now 2000 members of the association out of work, as against 1830 in the previous month. Much of this increase is attributable to the Blackburn and Aberdare disputes and to the lock-out on the Clyde. Whatever may be the cause, the secretary remarks, "the prospect is not encouraging, and we may consider ourselves fortunate in being able to hold our own." The reports from Canada are equally unfavorable, and many English artisans are said to be returning. Whether the war that is exciting Europe has anything to do with it is a question yet to be solved, but whatever the result may be they could hardly be worse off than at present.

M. Cance has called the attention of the French Academy to a new system of electro-magnets with multiple cores, similar to that of Camacho, but with series of small rods of soft iron substituted for the tubular cores, and enveloping the different coils. The rods are all put in contact with the breech of the electro-magnet, and strongly fastened at their base with a bronze collar, so as to make one solid piece. This arrangement is said to offer the following advantages: 1. Retaining permanent magnetism very little (as the demaguetization of the rod is almost instantaneous). 2. Giving a sphere of lateral attraction as extensive as may be desired (since it is in relation to the number of rod cores). 3. Easier construction than that of electro-magnets with tubular cores. The sole inconvenience is that the system gives pretty strong sparks of extra current; but with systems of interrupters by deviation from the main circuit, or condenser, the evil may be obviated.

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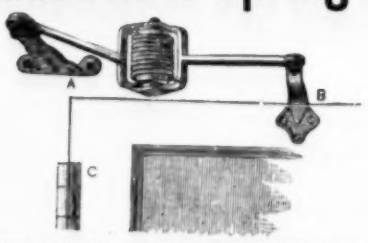

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THE SCROLL SAW.

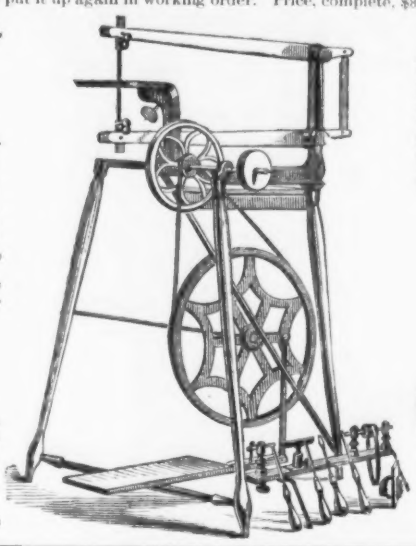
Length of arms	20½ in.
Length of sweep for work	17 "
Height of table above floor	31 "
Diameter of table	6 "
Length of stroke	1½ "
Diameter of driving wheel	12 "
Diameter of balance wheel	6⅝ "
Diameter of emery wheel	3½ "
Number of strokes of saw per minute	1,000
Number of revolutions of emery wheel per minute	1,000

These speeds are made with a tread of 150 per minute.

Weight of Scroll Saw, 30 lbs.

THE LATHE.

Weight	6¼ lbs.
Length of ways over all	15¾ in.
Distance between centers	9 "
Swing	3 "
Length of slide rest	4½ "
Height of head and tail stocks above ways	2⅝ "
Diameter of cone pulley	1¼ "
Number of revolutions per minute	7,000



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Diameter of saw	½ in
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Height from floor to table	33 "
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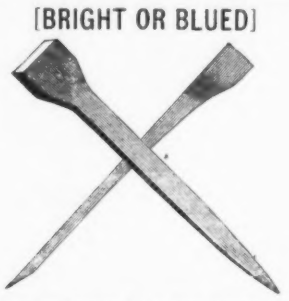

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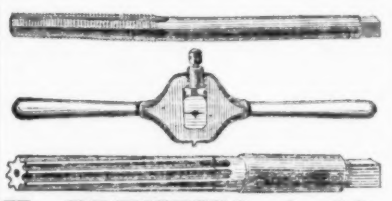

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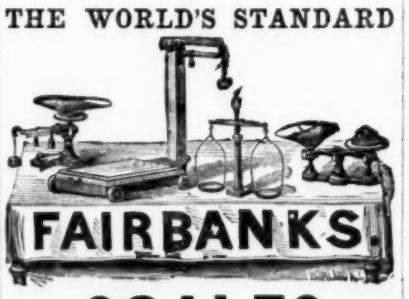

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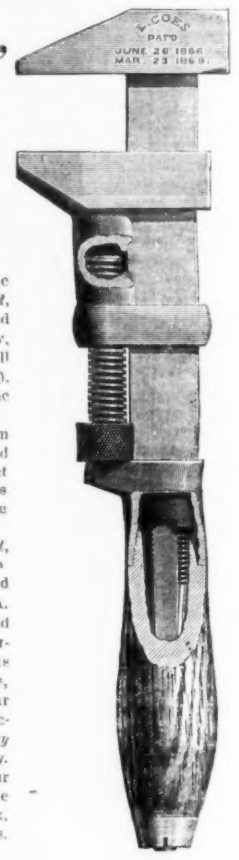

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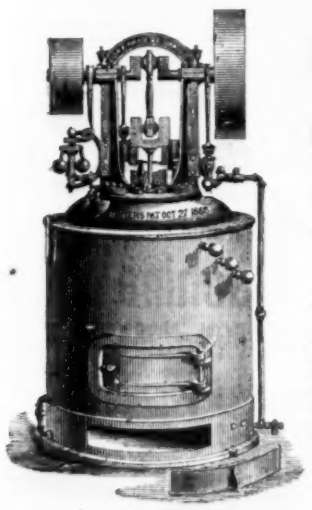

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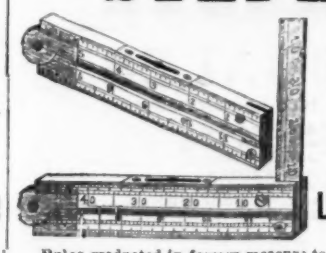

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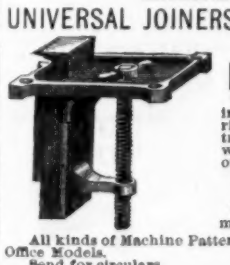

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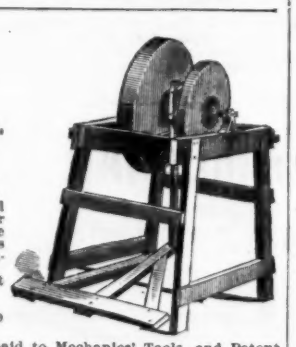

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MANUFACTURERS' AGENTS.

SOLE AGENTS FOR

Steel Wood Screws, and **Set** and **Machine Screws.**

Florence Tack Co.'s Tacks, Shoe and **Finishing Nails.**

Columbia Lock Co.'s Locks and **Knobs.**

AND

Cast Steel, Chain & General Hardware.

Staple Hardware now below Cost.

To Hardware Dealers:

Most if not all of the following named articles being now below the cost of manufacture, we would recommend their purchase by those whose stocks are low.

The prices attached are for *prompt cash only*, and the goods are guaranteed to be first quality. For a large proportion of those named, as well as for many others comprised in Hardware Jobbers' stocks, we are Manufacturers' Agents. For *all* we pay "spot cash," and, not employing travelers to sell our goods, we believe we can afford to sell for cash at lower figures than are current in the general market. We shall be glad to quote by mail on any goods that may be needed not enumerated in the list. The prices being unnaturally low, we do not guarantee against advance.

NEWLIN & YARDLEY.

Rim Locks, 4 in. full size, with cam fastening and polished bolts	₱ doz	$1.35
Rim Locks, 4 in. full size, with cam fastening and not polished bolts	₱ doz	1.10
Rim Knobs, Mineral	"	.90
" " Porcelain, Jap'd Rev	"	1.25
" " Porc'r Rev	"	3.25
Japanned Hat and Coat Hooks, No. 75	₱ gross	.72
Bronzed " " No. 80	"	.75
Window Pulleys, 1¾ in., No. 5, Papered	₱ doz	.16
" " 1¾ in., No. 15, "	"	.20
Turnbuckles for Frame	₱ gross	3.25
" " Brick	"	3.00
Pittsburgh Pat. Thumb Latches	"	3.75

Northampton Shell Bolster Cocoa Butcher Knives—

5,	5½,	6,	6½,	7,	8 inch.
$1.75	1.88	2.10	2.35	2.90	

Through Tang Cocoa Butcher Knives, no Bolster—

5,	5½,	6,	6½,	7,	8 inch.
$1.10	1.25	1.35	1.45	1.65	2.00

J. Russell & Co.'s Bolstered Cocoa Handle Knives and Forks, No. 1526	₱ gross	$8.50
J. Russell & Co.'s White Bone Knives and Forks, No. 109	₱ gross	8.25
Strap and T Hinges	dis 60&10 %	
Mallory, Wheeler & Co.'s Pads	310, 90c.; 1000,	$1.40
Metal Head Nail Gimlets	₱ gross	2.75
Hammered Oval and Round Pans	₱ ℔	18¼c
Mirror Face Sad Irons	"	2¾c
Eddy's Ass Skin Tapes, 50 ft	₱ doz	$3.75
Philadelphia Files, warranted hand made	dis 30 % from list	
Morton's Spring Balances, 24 lbs., small		$1.10
" " 24 " regular		3.25

Socket Framing Chisels—

¼,	⅜,	½	⅝,	¾,	⅞,	1,
3.75	3.75	4.40	5.00	5.70	6.40	6.90	7.50 net

Socket Firmer Chisels—

⅜,	½,	⅝,	¾,	⅞,	1,
2.00	3.50	3.87	4.20	4.40	4.75	5.00 net

Curry Combs, 6 Bar, Bronzed			$1.20
" 8 "			1.35
" 6 "	Black		1.10
" 8 "	"		1.25
Soapstone Slate Pencils		per M	2.50

Hard Frame Slates—

5x7,	6x9,	6½x10,	7x11,	8x12,	9x13,	
32c	44c	47c	50c	62c	72c	₱ doz net

Close Link Coil Chain—

3-16	¼,	5-16,	⅜,	7-16,	½,	
10¼c	8½c	7½c	6½c	6	5½c	₱ ℔ net

Baldwin's Warranted Cast Steel	₱ ℔	12½c
In ton lots, 12c ₱ ℔.		
Philadelphia Coal Hods, Oval or Fancy—Japanned	₱ doz net	
Galvanized	₱ doz net	
Florence Tacks, Shoe and Finishing Nails	List and disc't on application	
Steel Wood Screws	dis 60&10 %	

Japanned: 14, $2.80; 15, 3.20; 16, 3.60; 17 inch 4.00

Galvanized: 14, $4.20; 15, 4.50; 16, 4.80; 17 inch 5.60

Price guaranteed the same as that of the best Iron Screw makers, and quality superior to any Iron Screw made.

Also Round and Flat Head Blued and Brass Screws, and Steel Machine and Set Screws and General Hardware.

Newlin & Yardley,

PHILADELPHIA.

BALDWIN'S

Premium Mangle

Guaranteed to perfectly perform all work. Either steam or hand power. Cold or steam heated Rolls. Cheap, durable, highly recommended.

National Home for Disabled Vol. Soldiers, Eastern Branch, Togus, Me., August 4, 1877.

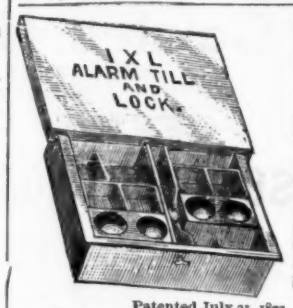
Standard Laundry Machinery Co.—Gentlemen: It gives me pleasure to state that one of your "Baldwin Steam Mangles" has been used in our laundry for several months, and has thus far given *entire satisfaction, being simple well made and easily run.*

Yours, truly, Wm. S. Tilton, Dep. Gov.

For circulars apply to

Standard Laundry Machinery Co.,

32 Dey Street, New York. 58 Long Wharf, Boston.



This Drawer has sixteen compartments. For efficiency, durability and convenience it is proved to be superior to any in the market, while it has this advantage over all others, that any one using a common drawer can attach our lock to it in a few moments. It is a common lock—when set, a combination lock—and is also an alarm lock.

Patented July 31, 1877.

For sale at all the principal Hardware Houses in New York and elsewhere, also in the Manufacturer's Office, *24 Dey St., New York.* Price Lists furnished to the trade only.

Eagle Plumbago Co.

Crucible, Lubricating, Electrotyping, Stove Polish, and other grades of

PLUMBAGO,

FOR SALE BY

CONGREVE & SANDERS, Sole Agents,

104 & 106 John St., New York.

JACOB FOOSE,

Lancaster, Pa.

TRADE MARK.

Manufacturer of

Copper Kettles,

And all kinds of Copper work, from 2 to 50 gallons

P. S.—Send for price list.

HOTCHKISS' PATENT "SUPERIOR" CURRY COMBS.

We invite the special attention of the trade to our

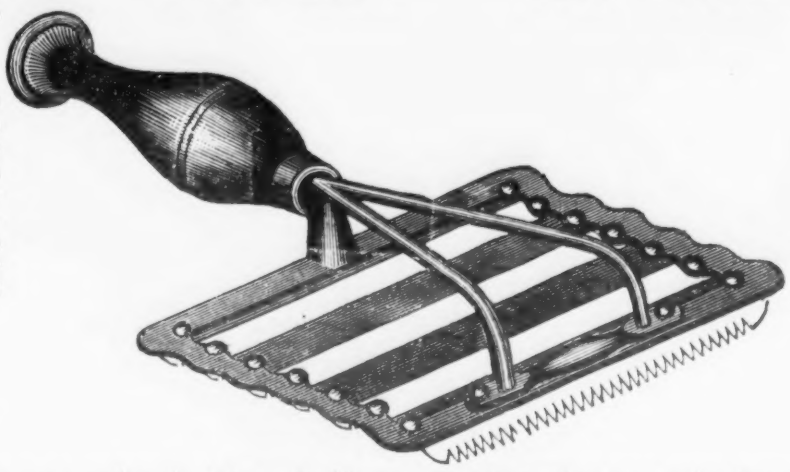
Patent "Superior" Curry Combs,

which are the ***best*** and ***most complete*** side handle combs having a grasp over the back now in existence, and which for ***neatness, strength*** and ***durability*** have ***no*** equal. Give them a trial, and you will be convinced they are ***superior*** to ***any Curry Comb in the market.*** They are neatly put up in paper boxes of one dozen each, and packed 15 dozen in a case. For sale by the Jobbing Hardware, Saddlery and Wooden Ware trade.

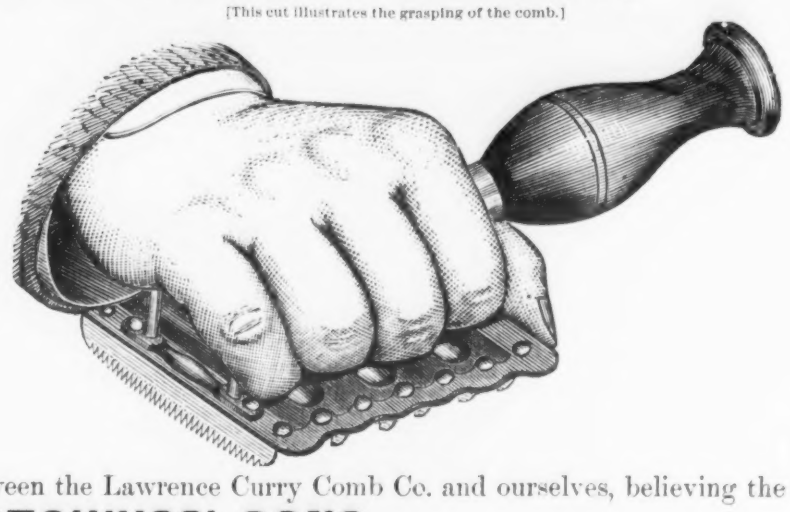
HOTCHKISS' SONS,

Bridgeport, Conn.

SAMPLE AND WAREROOMS,
113 Chambers Street, Y. N.



[This cut illustrates the grasping of the comb.]



We do not propose to resort to printer's ink to decide any questions that may arise between the Lawrence Curry Comb Co. and ourselves, believing the court the proper place to determine all such matters.

HOTCHKISS' SONS,
C. A. HOTCHKISS, President.

J. L'HOMMEDIEU'S and WATROUS & CO.'S SHIP AUGERS, AUGER BITS, TRENAIL AUGERS, Etc.

Ship Augers, With Screw.

Ship Augers, without Screw.

Nobles Mfg. Co.'s Double Spur Auger Bits.

In connection with our other goods, such as the

BROOK'S EDGE TOOL CO., SNELL MFG. CO., DAVIS LEVEL & TOOL CO., and P. MERRILL'S CHISELS,

We are the Sole Agents for, and take the entire production of, the following factories:

J. L'Hommedieu Ship Auger Works, Watrous & Co.'s Ship Auger Works, Nobles Mfg. Co., manufacturers of **Extra Double Spur Auger Bits, Augers, Braces, Adjustable Handle Drawing Knives, Etc.**

C. E. JENNINGS & CO., 98 Chambers Street, New York.

C. A. & W. L. TEAL,

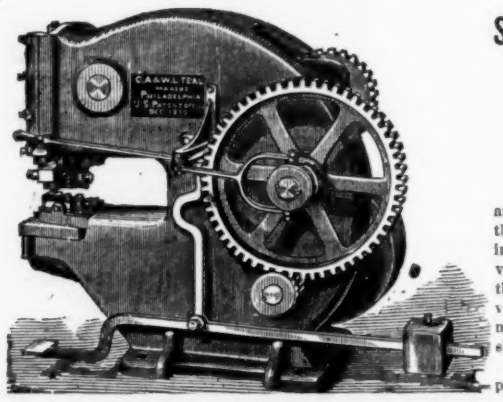
No. 4116 Ludlow Street, PHILADELPHIA, Manufacturers of

IMPROVED BOILER ROLLS, COMBINED PUNCHING AND SHEARING MACHINES,

SINGLE POWER PUNCHING MACHINES, with Shearing Attachments,

FISH-BAR PUNCHING MACHINES,

To punch four (4) holes and cut off the bar at one stroke.



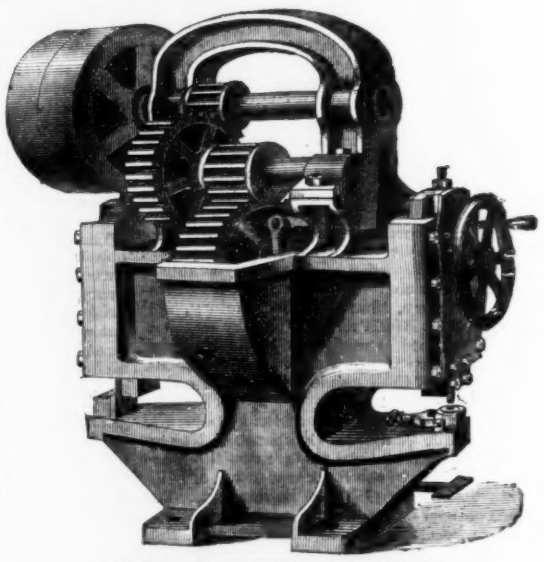
Steam Riveting Machines, Boiler Makers' and Machinists' Post Drilling Machines,

AND MACHINERY IN GENERAL.

COMBINED PUNCH AND SHEAR.

Our regular pattern for boiler makers will punch and shear in the center of 40 inches, will punch ¾ inch hole in ¾ inch iron, and shear ⅝ inch plate; is provided with an automatic stop motion for Punch "Head" that can be set by the operator to stop the punch at any point of the stroke; as for different thicknesses of iron the punch can be set to stop within ⅛ of an inch of the iron after punching the hole, where it will rest until the work is adjusted for the next hole and the clutch thrown in. Is also provided with an adjustable stripper, a gauge and two "rests," one on each side of the die to support the work. Shears run while the belt is on the tight pulley, but the punch can be operated by the clutch. When desired, punch end of the machine is provided with heavy bolts, giving ten inches reach to center of punch, and will punch 1 inch hole in 1 inch iron. We also make this machine with 12 inches reach on punch end, to punch 1 inch hole in 1 inch iron, and with shears set on an angle for splitting sheets and cutting off bars.

Our small pattern for boiler makers will punch 13-16 inch hole in ¾ inch iron, 15 inches from the edge, and shear ¾ inch plate 15 inches from the edge; is made for either hand or steam-power or both.



COMBINED PUNCH AND SHEAR.

THE POPULAR CURRY COMB.

Patent applied for.

A FULL LINE OF NEW CURRY COMBS.

Packed ½ doz. in strong paper boxes, 24 doz. in Wooden Cases. Send for price list.

WM. P. KELLOGG & CO., Troy, N. Y.

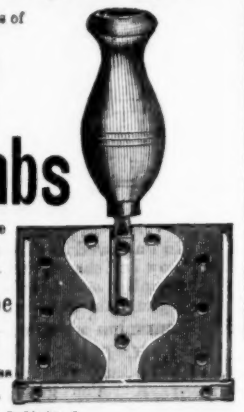
Wiebusch & Hilger Hardware Co., New York, Agents for the United States.

D. W. HAZLETON & CO

724 Girard Ave., Philadelphia

Manufacturers of

Curry Combs



Galvanized Square and Ornamental

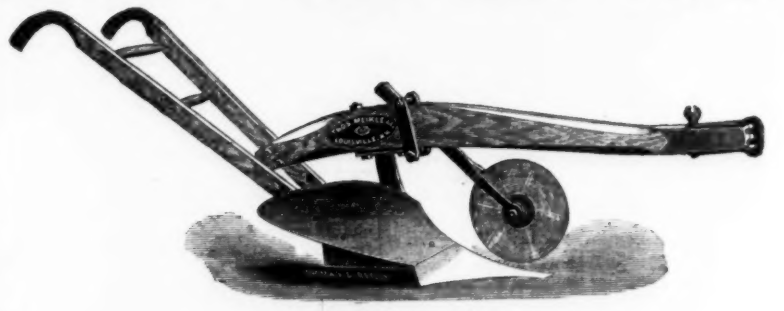
Conductor Pipe

RIBBED TUBING

Stamped & Press Work to order.

Correspondence Solicited.

Meikle's Steel Sod Plow.



MANUFACTURED BY

THOMAS MEIKLE & CO.,

☞ Send for Illustrated Catalogue. **LOUISVILLE, KENTUCKY.**

PATENT DOUBLE ACTING SPRING BUTTS.

Patented April 18, 1876.

Send for price list and circulars

FOR SWINGING DOORS BOTH WAYS.

These Butts are the first ever constructed with two leaves only, and with flanges attached thereto for fastening to the door and casing, thus rendering them much more substantial and easy to put on, as the screws are all driven from the outside. By means of the flanges the door is hung firmly to the casing, instead of to a strip *as is the case with all other double acting Butts*, and the screws do not become loose, as the strain on them is much less. On the back of the Butt is a powerful volute spring, and draws in *direct line* with the center of the door, thus holding the door firmly in position, and *obviating all sag*. Our price list is from 25 to 40 per cent. lower than others. Manufactured by

THE SABIN MFG. CO., Montpelier, Vt.

DUPLEX Curry Comb

We call the attention of Hardware Dealers to our Double Curry Comb, comprising a fine and coarse side: or virtually two combs in one. It is useful, durable and novel, and needs no argument to convince any one of its practicability. It sells on sight, and is bound to supersede all other combs. We want one reliable dealer in each State or large city to handle it. Correspondence solicited. Address

I. N. CASSELL, Fredericktown, Ohio.

CHAS. E. LITTLE, 59 Fulton St., N. Y.

1760. 1876.

Solid Cast Steel Pump Augers

Solid Cast Steel Augers & Reamers

For Boring PUMP LOGS. All sizes in stock. **Socket Shanks. Ring Handles, and Connecting Rods** for the above to order. Also **Tenoning Tools** for joining log ends. **Coopers'** and **Slaters' Tools,** Tool Chests. Tools for all trades a specialty.

THE SWIFT MILL.

ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER

Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

LANE BROS., Millbrook, N. Y.

Also sold by leading wholesale houses.

Our agents, Graham & Haines, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at Factory prices.

BAEDER, ADAMSON & CO.,

Manufacturers of SAND & EMERY PAPER & EMERY CLOTH.

(Also, in Rolls for machine work.)

Ground Emery, Corundum & Flint, Glue & Curled Hair, Hair Felt, & Felting for Covering Boilers, Pipes, &c., Cow Hide Whips

Stores: { **PHILADELPHIA, 730 Market St.,** | **BOSTON, 143 Milk St.,**
{ **NEW YORK, 67 Beekman St.,** | **CHICAGO, 182 Lake St.**

INDUSTRIAL ITEMS.

MASSACHUSETTS.

J. Jordan & Son, of East Windsor, have lately contracted to make 100 patent wringing machines for a Pittsfield inventor. They think the machine will prove a decided success, and if it does it will set them up in business for years to come.

RHODE ISLAND.

The Providence Tool Company, having succeeded in getting paid by the Turkish government, have resumed operations on their contract for the manufacture of arms, and give work to 1300 men.

The great Corliss engine in Machinery Hall, Philadelphia, has been taken down and packed ready for removal to Providence. Seventy railroad cars will be needed to carry it.

CONNECTICUT.

The old copper and silver mine in Mine Hollow, Bristol, which is supposed to have been worked in revolutionary war times, has been leased by O. T. Earle, of Bridgeport, who will soon begin to operate it. A tunnel 60 feet long and 8 feet in diameter extends horizontally into the rock, but by whom or exactly when it was made is not known. Mr. Earle has also opened a silver and graphite mine in Collinsville, on the Daniel Dyer farm, which promises rich results. Some specimens, it is said, have assayed $600 per ton.

By the bursting of a 600-pound grindstone at the Meriden Cutlery Company's works on Monday, Robert Boddington was thrown to the ceiling of the room where he was at work and severely bruised, but fortunately escaped without more serious injury.

The Corpe foundry and machine shop property at Furnace Hollow, Stafford, was sold at auction on Tuesday to George Adams for $290. It comprises nearly six acres of land, four buildings, with a furnace, two water-wheels and a large quantity of cast iron pipe, the whole having cost over $5000, and being mortgaged for $2500.

Business in Meriden is growing better. The Meriden Silver Plate Company has resumed ten hours time after a long run on eight, and the Charles Parker Company is working full time, with plenty of orders. The Meriden Britannia Company, the leading industry of Meriden, already feels the benefit of the return of its president, the Hon. H. C. Wilcox, from Europe.

The Cartridge Company have just finished their last heavy Turkish order, but are reported to have nearly completed arrangements for another contract with the same government. The facilities of the shop are all the while being increased, which does not look as if the company apprehended any decrease in their business. They are now at work on their heavy contracts with the Russian Government. The Russian ammunition is sent to New York before being finally shipped, a lighter with a cargo having left the harbor yesterday.—*Bridgeport Farmer.*

The Hartford correspondent of the New York *Sun* sends the following to that paper: "The three largest manufacturing establishments of this city—Colt's Revolver and Firearms Factory, Sharp's Rifle Factory, and Woodruff & Beach's Iron Foundry—each of which in good times employs hundreds of workmen, are almost entirely at a standstill. Four-fifths of their hands are thrown out of work."

C. A. Hotchkiss & Son, of Bridgeport, and the Tuttle & Whitmore Company, of Naugatuck, are both anxious to purchase the foundry belonging to the bankrupt estate of Hubbell, Walker & Gill, of Bridgeport. The price offered for the works by the Tuttle and Whitmore Company is $11,500, and that offered by C. A. Hotchkiss & Son, $12,500. The latter also proposes, in case the property is offered at auction, to start the sale with an offer of $11,500.

The proposed removal of the Shelton zinc mill, never abandoned, is being actively agitated once more, and St. Louis or New York, between which the choice of location lies, may yet become the seat of this industry.

NEW YORK.

Sunday operations at the Albany and Rensselaer Iron and Steel Works have been suspended indefinitely.

The Cedar Point Furnace, Port Henry, blew out August 28, ending a run of 2 years and 16 days. It will be immediately repaired and blown in, but whether on Bessemer pig is doubtful. The average production for the blast has been 41¼ tons per day; average quality, No. 2 Bessemer.

PENNSYLVANIA.

The Millerstown Iron Company has been fortunate in securing the lease of a tract of land containing a large deposit of valuable hematite iron ore. Explorations have proved the deposit to be extensive, and the company will lose no time in erecting the necessary machinery to raise the ore. The tract belongs to William Neumoyer, residing a few miles above Macungie, on the road leading from the above-named place to Hensingersville.

It is rumored, says the Birdsboro *Weekly Tribune*, that the Messrs. Brooke contemplate enlarging the facilities of their rolling mill by building another addition to it and putting in more furnaces and rolls.

J. Wood & Co.'s sheet mill, at Conshohocken, which was shut down early in July, is again in operation.

Stewart Furnace No. 2 is doing remarkably well, averaging about 50 tons a day of Bessemer iron. The lining is all out, and brick has arrived for No. 1. They are still shipping iron from these works, principally to the Edgar Thompson Steel Works, in Pittsburgh.

Keel Ridge Furnace is in blast.

Both of the Westerman Furnaces are doing well

At the Westerman hoop mill, Sharon, they are turning out a very superior article of small hoops, from seven-eighths down to five-eighths. These sizes of hoops require a very superior brand of iron and careful handling; but we did not see a break in the edge of a single hoop, and were told that the iron was taken out of the pig metal pile promiscuously, which speaks well for the pig metal.

Both furnaces in West Middlesex are doing well, the Fanny averaging about 35 tons a day last week of good iron.

Workmen are engaged in fitting up Shenango No. 2. The lining will be in by the end of the present week, but there is nothing certain just yet about blowing her in.

Hooven's Mill, Morristown, is running double turn.

The Catasauqua Rolling Mill is again in operation.

The annual meeting of the stockholders of the Thomas Iron Company will be held at Hokendauqua, on Tuesday, 11th instant, at 12 m., at which time the election for directors will take place.

PITTSBURGH AND VICINITY.

A. Garrison & Co. have just finished and will ship this week one of the best trains of sheet rolls ever made in this country. The chill rolls are three-high, Lauth, 31x96, and the whole train is most complete. It is for the Chesapeake Works of C. L. Bailey & Co., Harrisburg.

Reese, Graff & Woods are running night and day on an order for bridge iron from the American Bridge Company, to be used in replacing the Omaha Bridge.

The Pittsburgh Steel Casting Company takes good care of its employes. One of them recently died in the West Penn Hospital and his widow was paid $200 in cash over and above all the wages due him. Another is about to die and the company is making preparation for the admittance of his wife to the Aged Woman's Home, at Wilkinsburg, which will cost $150.

The Beaver River is reported to be so low that it fails to furnish enough water to keep the mills at Beaver Falls in active operation.

The Castle Shannon miners have resumed work.

The big engines for the new water works will be finished in New York. The recent destruction of his works by fire prevents Mr. Hartupee from completing the job himself. There are other firms in the city possessed of ample facilities for doing the work, but, for reasons best known to themselves, they decline to accept the contract.

The steel works of Hussey, Howe & Co. are running moderately. This firm will build an office on the corner of Seventeenth street and Pennsylvania avenue, two stories, 28x55.

Hussey, Binns & Co. are running full. They have just sent a sample order of 100 dozen shovels to Germany.

OHIO.

The Scioto Furnace is in full blast.

The Cleveland Tube Works, on Hamilton street, are now owned and managed by John M. Sterling, Jr. Steam heating apparatus, vertical tube radiators, coils, coil and trimmings and tuyere coils are their specialty.

Something unusual may now be seen at the Lake Shore Foundry, Cleveland. It is a cast iron pipe with six-foot aperture, to be used, probably, in the place of a stone culvert. The iron is 1⅜ inch thick, which makes the pipe capable of sustaining great pressure. Some Michigan Railroad has ordered them, and if they work well there is no reason why they should not supersede the common stone culverts. Each one weighs three tons. This foundry turns out pipes of every description, besides castings for cars, bridges, &c., and car wheels. They send out piping in all directions, furnishing large quantities to Detroit for the water works, and other cities. About 110 men are constantly employed.

Rouse & Waterbury, manufacturers of stoves, ranges and hollow ware, have at their salesrooms, No. 163 River street, Cleveland, a newly patented first-class range—the Windsor—which is among the finest invented. A new Franklin parlor stove of great merit is also among their latest patterns. The warehouse of the firm at Black River is 56 by 112 feet in size and two stories high. Tin plate, sheet iron and tinners' stock are kept in full supply there. At Black River the firm also has a foundry, measuring 70 by 150 feet, and a boiler room, 20 by 20 feet. They employ 50 men.

The branch shops of the Cleveland Rolling Mill Company have started up again. Two hundred and sixty men are now employed, and the works are running full. It is uncertain, however, how long this will continue. Bessemer steel and iron rails and fastenings, boiler plate tire, axles, galvanized and black sheet iron and corrugated roofing and siding, besides spring steel and iron of all kinds are among the manufactured articles of this company at their various shops.

Brown & Curtiss, manufacturers of wagon hardware, agricultural implement irons, chains and wrought iron specialties, employ from 60 to 70 men. During the past month shipments have been made to 18 different States scattered all over the Union. A new patent wagon brake was sent out on the 1st of August, and its success numbered 10,000 sales. The pay roll of this concern is $2000 monthly.

The Ætna Furnace, Ironton, has on hand a large stock of coke, and expects to blow in the first of the coming month.

The Gaylord Rolling Mill Company, at Portsmouth, Ohio, is filling an order for 400 tons of hoop iron for bailing cotton.

The individuals composing the firm McConnell, Towne & Co., of Sciotoville, have incorporated their company under the name of Scioto Star Fire Brick Works.

MICHIGAN.

The Cambria Mine has suspended work. The Winthrop has been practically abandoned. The South Jackson has been idle for some time. The Mitchell, formerly Shenango, is raising 150 tons per day. Lake Superior's section 19 working force is to be increased to 75 men. The Saginaw is working day shift only, with 125 men.

The following shows the total shipments of iron ore from the Lake Superior district for the season, up to and including Aug. 22, together with those of a corresponding period last year:

From where	1876.	1877.
From Marquette	266,250	357,796
From Escanaba	203,055	246,713
From L'Anse	46,328	46,778
Total	515,633	651,287

Showing an increase of 135,654 gross tons. —*Marquette Mining Journal.*

WISCONSIN.

The Milwaukee rolling mills, it is rumored, will resume operations before long. They have been idle about a year.

ILLINOIS.

A. B. Meeker & Co., the great Chicago pig iron firm, now in bankruptcy, have secured liabilities amounting to $600,000, and unsecured $450,000. The assets show a nominal total of $1,671,000, scheduled as follows: Pig iron, rails, bills receivable and accounts, $921,000; unavailable, $300,000; private assets of A. B. Meeker, $450,000, of which $250,000 is unavailable. R. E. Jenkins has been appointed provisional assignee, with power to carry on the business of the firm.

KENTUCKY.

Princess Furnace is making 18 tons of No. 1 foundry iron per day.

Charlotte Furnace is making a little over 12 tons of iron per 24 hours.

Six more weeks will finish the improvements and repairs of the Ashland Furnace, which will cost the company $35,000.

The improvements of the Norton Iron Works, at Ashland, will not be completed before two months; their cost will amount to $80,000.

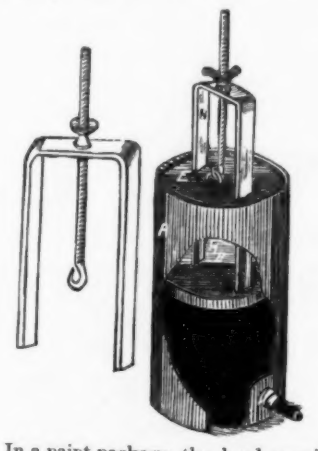
Hunnewell will not blow in before the 18th of September. Her last blast, finished on the 18th inst., represented a run of 200 days, during which she made 3402 tons of No. 1 iron, running on 2 77-100 tons of iron ore, 127-1000 tons of limestone and 138 95-100 bushels of charcoal per ton of iron made.

New Patents.

We take the following abstract of new patents, recently issued, from the official record:

CAN FOR PACKING AND SHIPPING PAINTS.

To H. H. Hull, Cleveland, Ohio.—July 24.—1. A can whose head is formed with the engaging loop and openings, in combination with the paint emptying attachment, made independent thereof.



2. In a paint package, the head provided with a central loop and openings extending through the cover on each side of said loop, in combination with a piston, a movable frame extending through the head, a screw shaft, and tightening nut.

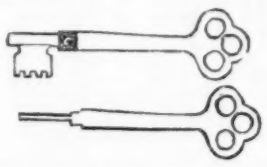
3. The combination, in a paint can, of a discharge orifice D, loop G, perforations E, temporary sealing F and piston head B.

4. The combination, with a paint package provided with a piston, of an independent frame, constructed to be inserted through the head of the package, a screw shaft adapted to be removably secured to the head and a tightening rod.

5. As an article of manufacture, a device made independent of a paint can, and adapted to detachably engage therewith in the process of emptying it of its contents, the same consisting of the arch or bow-shaped frame, the longitudinal screw shaft and the nut or other analogous mechanism for operating the said shaft.

KEY FOR LOCKS.

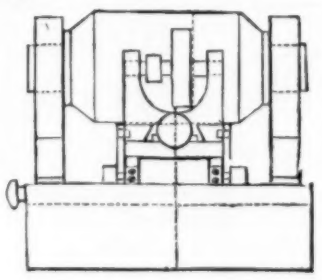
To W. H. Taylor, Stamford, Conn.—July 17.—1. A key shank and bow formed of one piece of sheet metal, and provided with a tenon and projection thereof smaller than the tenon.



2. An improved key, composed of a sheet-metal bow and shank, and a slotted bit stem, the two united as a ferrule that serves as a stop or gauge for the key.

GRINDING MACHINE.—REISSUED.

To J. M. Poole, Wilmington, Del.—July 24.—Dated Aug. 20, 1872. Patent No. 130,741.—1. A roller guide, substantially as described, in combination with a traversing carriage.



2. A roller guide, substantially as described, capable of a rotary adjustment, in combination with a traversing carriage.

3. A roller guide, substantially as described, in combination with a traversing carriage having a lateral movement.

193,554.—*Manufacture of Iron and Steel.*—J. Reese, Pittsburgh, Pa.—July 24.

1. The process herein described of treating the metal in the converter by introducing iron ore oxide in a divided state continuously, and by means of the air or other oxygen yielding blast, until decarburization is effected.

2. The process herein described of recarbonizing iron in the converter, by introducing plumbago in a divided state, and by means of the blast.

3. The process herein described for the manufacture of steel, consisting in first purifying and decarbonizing the metal in the converter by the introduction of iron ore oxide, and then recarburizing the metal by the introduction of plumbago by means of the blast.

Mr. Arthur Rigg, in his "Practical Treatise on the Steam Engine," just published, pays his respects to the meter system in the following expressive sentences: "The meter professes to be one ten-millionth part of the quadrant of the meridian passing through France from Dunkirk to Formentera, which at the outset debars it from being considered as a universal standard, and leaves it an exclusively French measurement, and its scientific derivation is practically ignored, for the meter is actually measured by the length of a platinum rod made by Border when measured at the temperature of melting ice. Even the measurement by this standard is incorrect, according to Sir John Herschel, by the 1-208th of an inch in the meter's length. * * * So far, then, from being an accurate division of the earth's surface, the meter is really no accurate measurement of anything, and such merits as it may possess finally rest upon convenience for general use, as compared with the yard, foot or inch. * * * The French meter is equal, according to the measurements of the French Academy, to 39.3827 in.; of Captain Kater to 39.37079 in.; of Mr. Hassler, United States Coast Survey, to 39.3802 in. Doubts have been thrown upon the correctness of all these measurements." It must be understood that Mr. Rigg does not object to the decimal system of measurement, of which the meter is only a French accident. Indeed, as he points out, every well-made rule has the inches upon it divided into tenths as well as eighths; but English measures are employed more extensively than any others in the world, and this affords strong testimony that they are inherently the most convenient. If a standard is required which shall represent some fixed astronomical or, more properly, terrestrial quantity, our author suggests that an imperceptible alteration in the length of an English inch would make it the 1-5005000000th of the earth's polar diameter. But "such a change would have no practical advantage except, perhaps, in making a cubic foot of water weigh exactly, instead of as now nearly, 1000 ounces."

An engineer of St. Petersburg, M. de Kern, announces the discovery of a new metal, which he calls davyum. It is found in the residues got from extraction of platinum. To isolate the element it is necessary, after having precipitated the ruthenium, to treat the mother lye with nitrate of ammonia. A red precipitate is produced, which on calcination yields davyum. This metal is easily attacked by *aqua regia*, and much less by boiling sulphuric acid; potash precipitates it in a yellow state, and sulphuretted hydrogen in a brown, passing into black through desiccation. With sulpho-cyanide of potassium the chloride of davyum gives a red coloration. From theoretical considerations developed by M. Mendeleeff, M. de Kern considers davyum to rank between molybdenum and ruthenium. On this supposition its equivalent should be near 100; and he proposes to test this experimentally.

Riehle Bros. scale works have shipped an 80,000 lbs. railroad track scale to the Lehigh Valley Railroad Company, for erection on the line of the New York Coal Railroad Company; also one of the same capacity to E. & G. Brooke, Birdsboro, Pa.

NEW CLIMAX WRINGER,

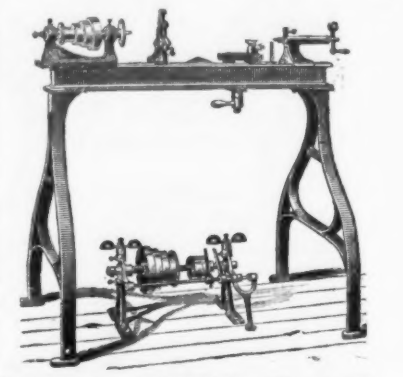
With Phelps' Patent Purchase Gear.

I am now prepared to fill orders at sight for six sizes, Nos. 1 to 6 inclusive

No. 1, Rolls	10x18⅝	per doz.	$	64.00
" 2, "	10x18¾	"		67.00
" 3, "	10x17⅞	"		72.00
" 4, "	11x17⅞	"		78.00
" 5, "	11x21⅝	"		93.00
" 6, "	12x21⅝	"		105.00
" 7, "	12x23⅝	"		132.00

Terms, 30 days, net. No discount for earlier payment.

Sept. 1st. 1877. **N. B. PHELPS, 102 Chambers St., N. Y.**



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TOOL & MACHINE WORKS,

Manufacturers of Engine, Brass Finishers', Wood Turners', Amateurs' and Jewelers' **LATHES.** Slide Rest, Screw Machines, Turret Heads, Screw Presses, Screw Clamps, Lathe Carriers, &c.

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CARRIAGE SPRINGS.

JOHN H. REOCK, PASSAIC SPRING WORKS,

Manufacturer of Railroad Car, Locomotive, Omnibus Platform and every variety of Carriage and Buggy Springs. 272 to 280 Passaic St., Newark, N. J. Lock Box 169

SAUSAGE MEAT CHOPPERS.

Kinyon's Patent, the "BOSS,"

3 Power Sizes, 4 Hand Sizes.

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Raritan, N. J.

Guyer's Improved **VEHICLE SPRINGS.**

The Best Wagon Spring in the Market for Farm Wagons, Lumber Wagons,

And all other wagons having bolsters and standards.

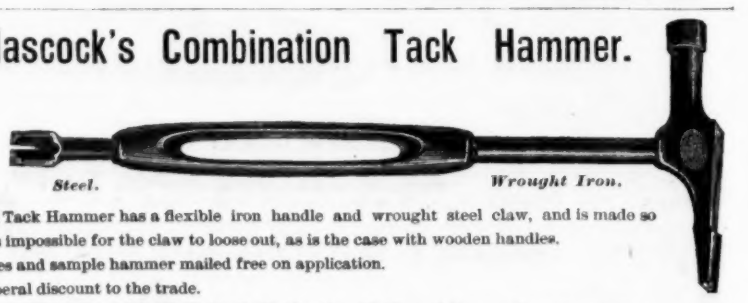
The Springs are not fastened to the bed. The pockets or cups in which are placed the coil springs are made of wrought, malleable or cast iron, two of which, with the iron connecting them, forming a saddle made in one piece, to straddle the end of the bolster 5 or 6 inches from the standards, as in the cut, there being under the bed four of these saddles, with 8 pockets and 8 springs. These saddles being hung on the bolsters can be easily taken off, by simply lifting the wagon bed; or the springs can be taken out and replaced by springs capable of sustaining different weights, running from one to ten thousand pounds, simply by having lighter or heavier steel coil Springs. A wagon will last longer and pull easier with Springs than without them, and avoids the constant pounding and jarring on the bed, spindle and wheels. These Springs are cheap and durable. Any person can put them on. A wagon will carry a heavy or light load with one set of Springs, by removing one-half of the Springs from the pockets.

Liberal discounts to **Dealers and Manufacturers of Wagons.** All inquries promptly answered by mail. Send for price list and circulars. Address

THE LAFAYETTE WAGON SPRING COMPANY,

Sole Manufacturers, **Lafayette, Ind.**

Glascock's Combination Tack Hammer.



This Tack Hammer has a flexible iron handle and wrought steel claw, and is made so that it is impossible for the claw to loose out, as is the case with wooden handles.

Prices and sample hammer mailed free on application.

A liberal discount to the trade.

F. R. GLASCOCK & CO., Manufacturers,

HILLSBOROUGH, OHIO.

The Silver & Deming FAMILY SAUSAGE STUFFER, Lard, Fruit & Jelly Press.

Powerful, Durable and Convenient.

The Best Article of the kind in the Market.

No. A,	capacity 2 quarts,	Japanned		$2.50
" B,	" 4 "	"		4.00
" AA,	" 3 "	with inside of Cylinder Enameled		4.00
" BB,	" 4 "	with inside of Cylinder Enameled		5.50

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MANUFACTURED BY

SILVER & DEMING MFG. CO.,

SALEM, OHIO.

Also Manufacturers of a full line of

Butchers' Meat Choppers & Stuffers.

Fig. 2.

(Tipped back for filling.)

N. & G. TAYLOR CO., Philadelphia.

TIN PLATE.

We have the LARGEST Square Sheet of Tin Plate ever made, 144 inches long by 48 inches wide.

ALSO,

The SMALLEST Sheet of Tin Plate ever made, 6 inches wide by 10 inches long.

Between these extreme sizes we have open for inspection our immense stock of odd and regular sizes of Tin Plates of all grades, qualities and thicknesses, ranging from number 38 to numbes 12 gauges.

In addition to the above—and our assortment of special Patterns, Splayed Boiler Sheets, Milk Pan Tin, Stove Door Lining Plates, etc.—we always carry in large stock,

CIRCLES of Every Description,

From 6 Inches to 40 Inches, IC to 8X Thickness, No. 30 to No. 20 Gauge, 3 Ounces to 30 Pounds Weight.

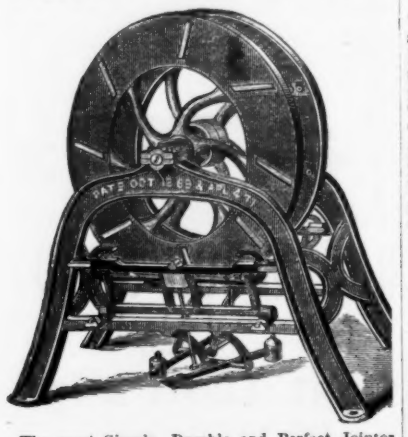
These are all stamped out, by correct dies, from the very finest quality of Charcoal Plates, and afterward tinned.
Send for our illustrated catalogue, descriptive circulars and price lists.

When desiring any information on Tin Plate, it will be to your advantage to write us.

N. & G. TAYLOR CO., Philadelphia.

CROSSLEY'S

Patent Stave Jointer.



The most Simple, Durable and Perfect Jointer made. In four sizes, jointing from 16 to 46 inches in length. In use from Maine to California. Is used by the largest stave and barrel manufacturers in the world. Will pay for itself in 90 days in saving of time and timber over any Saw Jointer ever used. Send for circular to.

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Manufacturer of Patent

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Pad Locks,

FOR

Railroad Switches, Freight Cars,

AND THE HARDWARE TRADE

All sizes, with Brass and Steel Keys, with and without chains.

PASSENGER CAR LOCKS,

Bronzed, Nickel-Plated and Japanned.

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141 to 145 Railroad Avenue, NEWARK, N. J.
Illustrated Catalogue sent on application

The Patent Automatic Stokers

which were shown by Dillwyn Smith at the Centennial Exhibition in the British section, and obtained the medal and highest award, are now offered to the users of steam in the United States, by the "United States Automatic Stoker Co.," under a license from Dillwyn Smith, for use on land boilers, with full confidence that the satisfactory results obtained in Great Britain and on the Continent of Europe (where over 1200 of them are in use), will be fully realized here. Some of these results are: The generation of from 25 per cent. and upward of steam from a given grate surface above what is obtained from the same quality of fuel fed by hand. The lessening of the cost of steam from 10 to 30 per cent. from being able with the Stokers to properly burn a lower priced fuel. The entire removal of the smoke nuisance. The lessening of the labor of the fireman. Their use also materially reduces the temperature of the fire room and also prevents the injury to the boiler caused by the contraction and expansion of the plates resulting from the frequent opening of the fire doors in hand firing. These and other advantages have secured their introduction into the boilers of many of the largest Mills and Iron Works in England and other countries, and we are now turning out an average of 10 machines per week. A few letters are given from some of those having them in use, the statements in which can be implicitly relied upon. For information respecting price, &c., apply to

THE UNITED STATES AUTOMATIC STOKER CO.,

DILLWYN SMITH, President, 2 Chestnut St., Philadelphia. ***Or ISAAC COLLINS, Secretary.***

LAND MACHINES.

From A. M. Collins, Son & Co.'s Factory, Third and Canal Streets, Philadelphia.

April, 3, 1877.

DILLWYN SMITH, Esq.—*Dear Sir:* After several months' experience with your Automatic Stokers, we take pleasure in stating that they have proved entirely satisfactory to us. The saving in cost of fuel we estimate at 20 per cent., increased amount of steam fully 30 per cent., beside giving us a *very regular supply*, the variation not being appreciable on steam gauge. Hoping you may be successful in introducing them into general use in this country, we remain

Yours, truly, A. M. COLLINS, SON & Co.

Wigan Coal and Iron Company.

Wigan, September 29, 1875.

Dear Sirs: I have pleasure in certifying that the Stokers applied to our boilers at Kirkless have worked to our satisfaction, and have effected a saving in fuel. Be good enough to put in hand six more for the range of boilers at our Alexandria Pit.

I remain, yours, truly, W. H. HEWLETT.

From J. R. Jones, Esq., Afonwen Paper Mills, Holywell.

Your Stokers answer my purpose; without them I could not have obtained that regular supply of steam throughout the day. I formerly used coals; with the Stoker I use slack, and save fully 25 per cent. in cost of fuel. They are suitable for all boilers.

The Earl of Dudley's Round Oak Works, Birmingham, 6th March, 1876.

I have much pleasure in stating that the Stokers you have fixed at these Works are giving most satisfactory results. The first you put down convinced me that we could use it for burning the fine siftings or dust from the slack; and those you have since erected have fully confirmed me in that opinion, for not only do we now use the siftings we could not previously burn at all, but the generation of steam is so rapid that we have discontinued using one of the boilers, finding we can obtain, by the aid of your Machine, quite as much steam from three boilers as we previously could from the four.

Yours, truly, R. SMITH CARSON.

Hurst Mills, Ashton-under-Lyne, 20th September, 1875.

Dear Sirs: We have had your Patent Mechanical Stokers in our use for some time, and find they work to our entire satisfaction, and effect a considerable saving in coal. Yours, respectfully,

CLDHAM WHITTAKER & SONS, *Per* W. THORP.

Note.—They have ten double Machines at Work.

THE AMERICAN MACHINE COMPANY, Philadelphia, Pa.,

MANUFACTURERS OF

SPECIALTIES OF LIGHT IRON WORK.

CROWN WRINGERS,

with Patent White Rubber Rolls, Galvanized Malleable Iron Frame Work, Bessemer Steel Springs, &c. Noted for Strength, Durability, Efficiency and Simplicity.

No. 2, Rolls 1½ in. diam., 10 in. long. No. 2½, Rolls 1¾ in. diam., 12 in. long.
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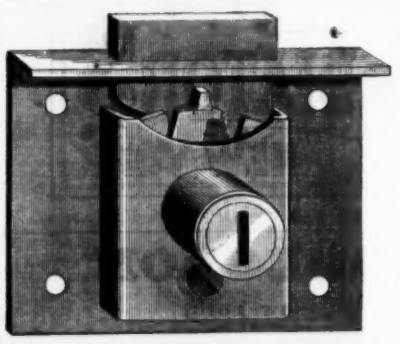
CROWN FLUTING MACHINES,

with valuable improvements over other style Machines, Patent Spring Arrangement and Clamping Device. Noted for Superiority of Finish and Practical Advantages. The leading Machine in the market.

Sizes (length of Rolls), 4½ inch, 6 inch and 8 inch.
Rolls with 10, 12, 15, 18, 22, 26 and 30 flutes.



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Drawer Lock.

THE

"STANDARD."

Applicable also to Cupboards, etc.

Made wholly of Brass, and finely finished. Each Lock has two flat, steel, nickel-plated Keys.

Dealers desiring to examine this Lock will receive a sample without charge, by addressing

The Yale Lock Mfg. Co.,

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MANUFACTURERS OF

Newman's Pat. Mincing Machines,
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Wall Safes or Cylinder Rings,
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And Builders' Hardware generally.

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PATENT CONVEX

Fluting & Smoothing Iron.

1st. It can be used as an ordinary Smoothing Iron. 2d. It is a fluting Machine as well as a Smoothing Iron. 3d. The Fluting Attachment being made of brass and convex in form, it has all the advantages of the crank machine. 4th. It combines the two articles in one, taking up the room of but one machine, and is always ready for use.

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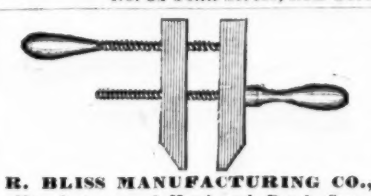

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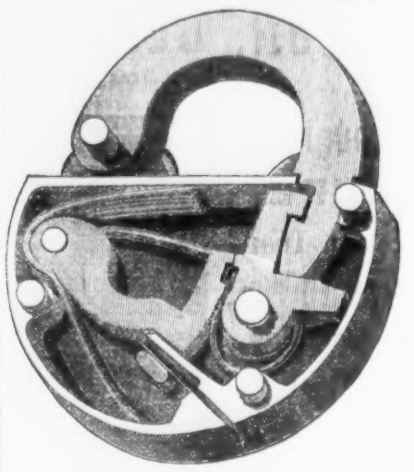
Manufacturers of Hand and Bench Screws, Clamps, Chisel, Auger and Brad Awl Handles, Book Binders' Presses, Plows, Sewing Benches and Finishing Tool Handles, Croquet Games, Tool Chests, Toys and Novelties.

Illustrated Catalogue and prices furnished on application. **Pawtucket, R. I.**



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DIAL BANK LOCKS,

made on the new principle, which greatly simplifies their construction and at the same time makes them absolutely proof against picking. $300·00 is hereby offered to the person who will fairly pick the Key Lock either the Mortise Lock or the Padlock; and $500·00 for picking the two-tumbler Dial Bank Lock.

These Locks are made of bronze or malleable iron, and combine the three qualities of simplicity strength and absolute security.

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BALDWIN LOCK CO.,

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Coyle's Patent Boiler, Flue and Tube Brushes.

HENRY F. HAUBRY, Sole Proprietor and Manufacturer, Hedenberg Works, Newark, N. J.

To these Brushes 1st Premium, Medals and Diplomas were awarded at the following fairs: Am. Institute, N. Y.; Mo. State, St. Louis; Ohio State, Columbus; Louisiana State, New Orleans; New Jersey State, Newark; and the Centennial. Patented in America and England.

American Hay Elevator

The most perfect and simple, and the only elevator that raises the hay from wagon and carries it back in the barn any distance required. It can also be used in stores, &c. This elevator received the highest award at the Centennial field trial. Price $2, with large discount to the Hardware trade.

Manufactured by the Patentee,

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COAL WASHING MACHINES AND IMPROVED COKE OVENS.

S. DIESCHER,

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Oldest and Largest Establishment of the kind in the U. S.

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Manufacturers of Pennsylvania Brick Machine Little Giant Pipe Machine, Fire and Red Brick Presses, Clay Wheels, Tile Machines, Stampers, Grinding Pans. Brick Yards fitted out for running by steam or horse. Heavy and Light Castings. Send for circular.

Babcock's Sash Fastener,

PATENTED JAN. 11, 1876.

Needs but to be seen to be Appreciated.

Send for Circular. Sample, 50c.

C. P. BABCOCK, Portland, Me.

State Rights For Sale.

Trade Mark.

IRON PAINT

The Cheapest and most Durable Paint known for Cars, Roofs, Bridges, Iron, Brick and Wooden Buildings, etc. All Paint guaranteed as represented, and trial orders solicited.

Pittsburgh Iron Paint Co.,

PITTSBURGH, PA.

EUREKA SAFETY POWER!

Practically **impossible to explode.** Tested to 300 lbs pressure per square inch. Will slit 2 inch seasoned oak—grind 3 bushels Corn per hour. **Price $250.** Also, Stationary Engines and Boilers and **Spark Arresting Portable Engines** for plantation use. Send for circular. Discount to the trade.

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STEARNS MFG. CO.,

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Engines, Boilers and Saw Mill Machinery.

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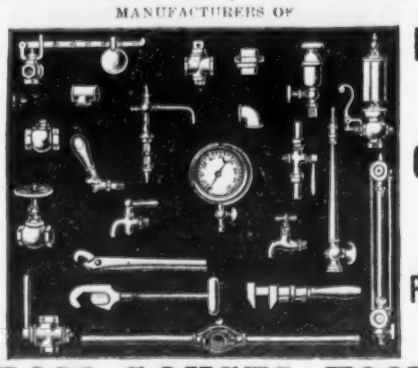

Brass & Iron **STEAM** Gas & Water FITTINGS. PLUMBERS' MATERIALS.

STEAM GAUGES, TOOLS,

And all Supplies used by Machinists, &c.

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Wrought Iron Boiler Tubes,

STEAM AND GAS PIPE, ENAMELED WATER PIPE.

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Saving of 25 per cent. dead weight, and increase of 50 per cent. in strength.

MACK'S PATENT INJECTOR, MOONEY'S PATENT VALVE.

All our Manufactures Warranted.

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Manufacturers of Patent

Straight Way Valves

FOR

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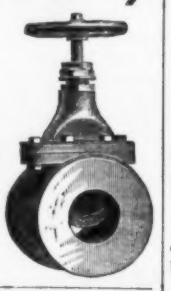

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G. T. HILL, Jr., Treas. N. H. SPAFFORD, Supt.

Send for Circular.

A PLANE FOR THE MILLION.

A Perfect Working Self-Adjusting Iron Plane, 3 1-4 inches long, with 1 inch Cutter.

The Little Victor is the most perfect Toy Plane ever invented. It is not a mere toy, but will be found useful in every house, shop, factory, store, bank, insurance office, printing office, &c. It is the best pencil sharpener in the world, and especially adapted to **Pattern Making and Scroll Saw Work.** It is an article of real value and practical utility, and sells on its merits.

We make nothing but Standard Goods.

SENT BY MAIL POSTAGE PAID

No. 50, Complete Adjustm't, Jap. ea. 45c., doz. $5 | No. 51, Screw Fastening, Jap'd, ea. 35c., doz. $4
No. 50, " " Nickel Plated " 50c., " 6 | No. 51, " " Nickel Plated " 45c., " 5
No. 52, Cam Fastening, Japanned, - 25 Cents each, $3.00 per Dozen.

SATISFACTION GUARANTEED OR MONEY REFUNDED.

Address, LEONARD BAILEY & CO., Hartford, Conn.

PUREST BLACK LEAD,

Lump and Ground.

McILVAINE BROS.,

15th and Hamilton Streets, PHILADELPHIA.

John T. Lewis & Bros.,

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MANUFACTURERS OF

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BROOKLYN WHITE LEAD CO. INCORPORATED 1853
SUPERIOR PURITY, DURABILITY AND COLOR
ADDITIONAL TRADE MARK
We caution consumers against dishonest and injurious brands, in addition to our own, of adulterated and greatly inferior qualities which are sold as our LEAD.
$50 Reward for detection of counterfeits.
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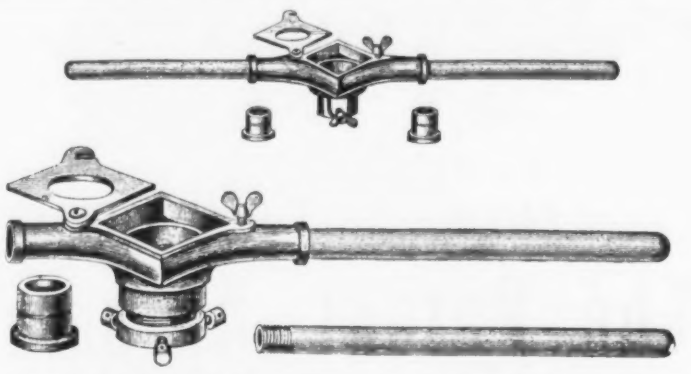

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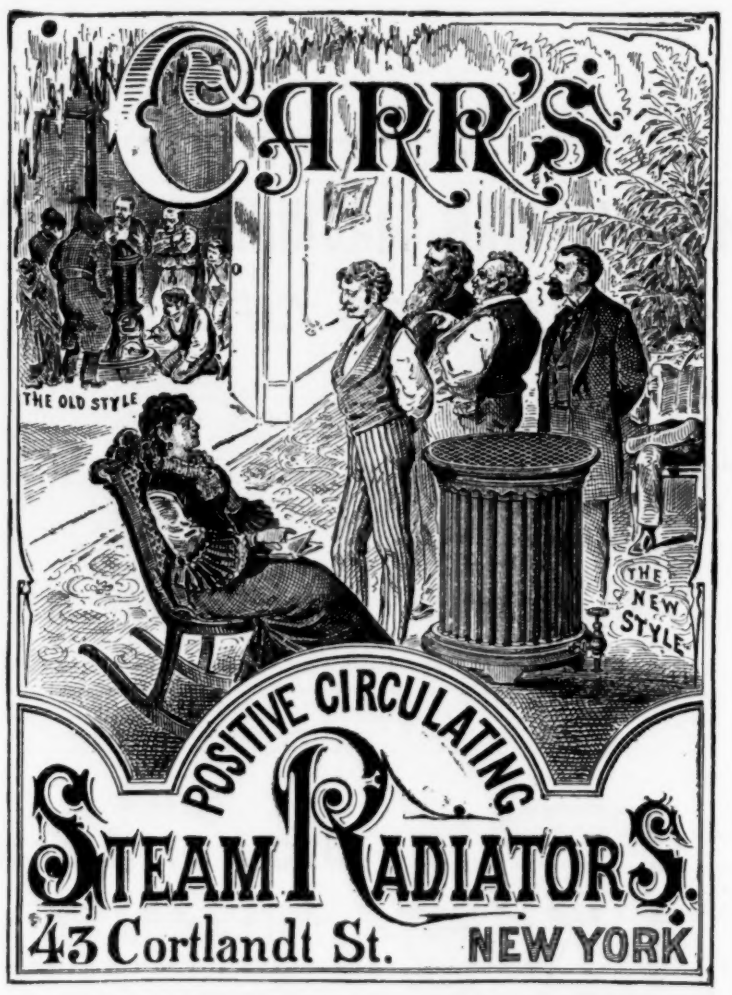

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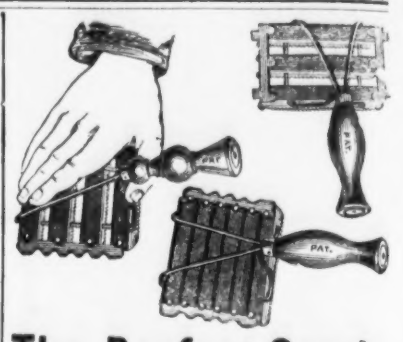

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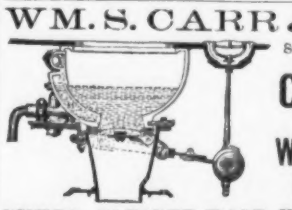

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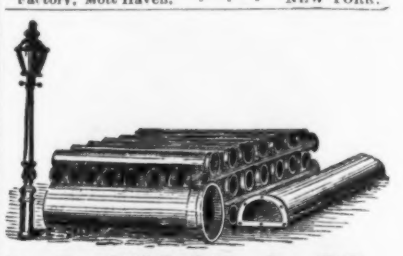

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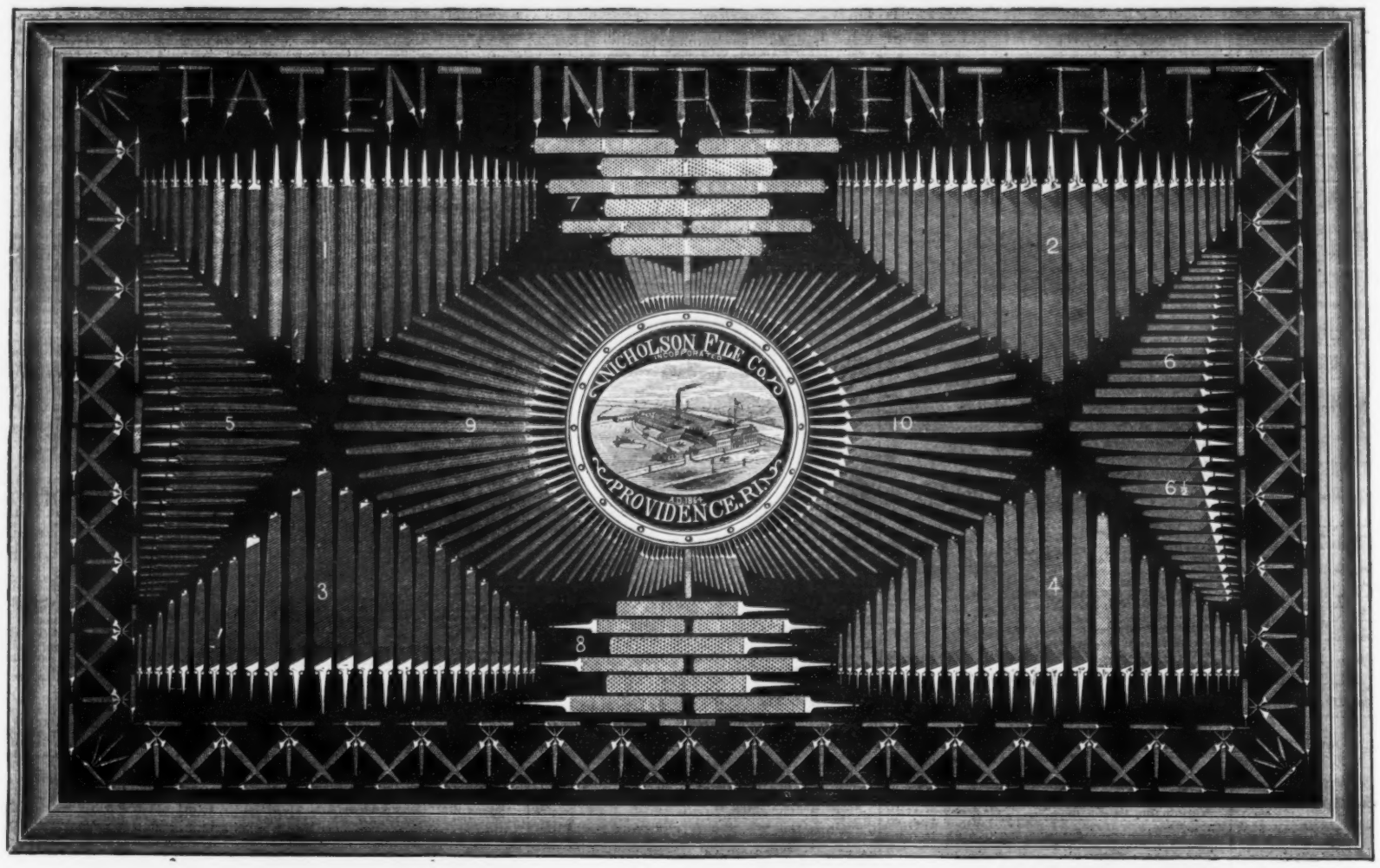

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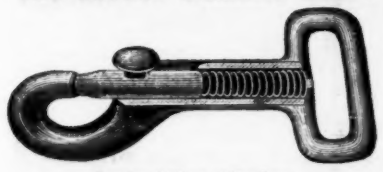

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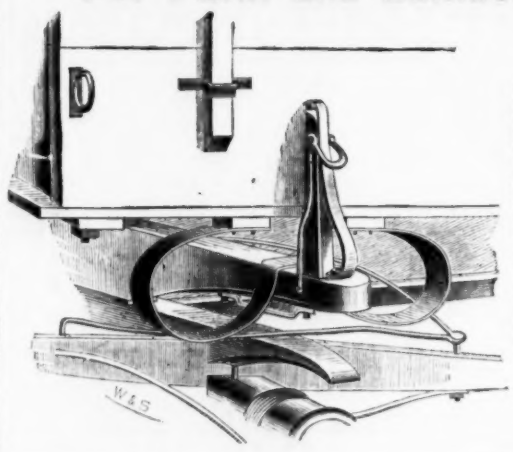

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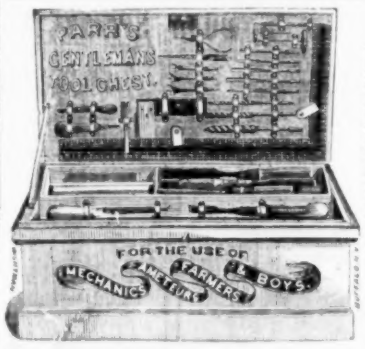

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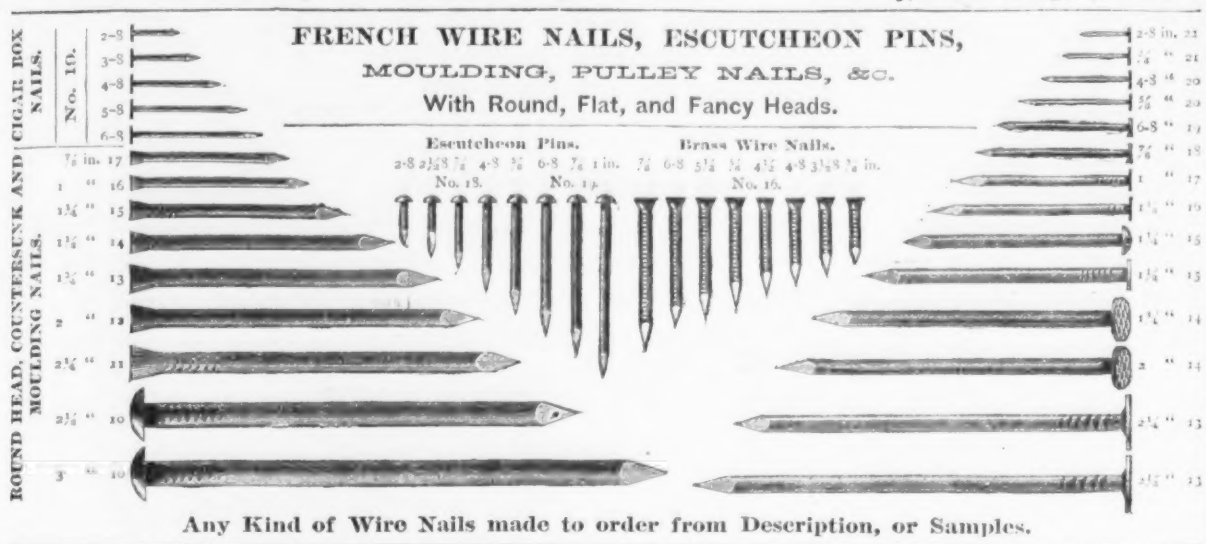

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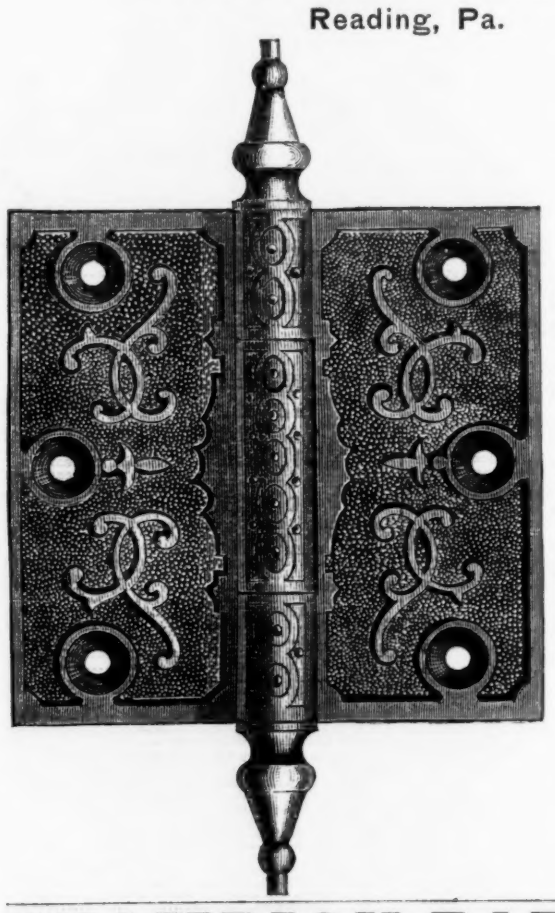

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Office, foot of Houston Street, East Rever,

NEW YORK.

The largest stock of Fire Brick of all shapes and sizes on hand, and made to order at short notice.

Cupola Brick, for McKenzie Patent, and others. Fire Mortar, Ground Brick, Clay and Sand. Superior Kaolin for Rolling Mills and Foundries. Stone Ware and other Fire Clay and Sand, from my own mines at New Jersey and Staten Island, by the cargo or otherwise.

Brooklyn Clay Retort AND FIRE BRICK WORKS.

Manufacturers of Clay Retorts, Fire Bricks, Gas House and other Tile, Cupola Brick, &c. Dealers in and Miners of Fire Clay and Fire Sand. Clay bank at Burt's Creek, New Jersey. Manufactory: Van Dyke, Elizabeth, Richards and Partition Sts., Brooklyn, N. Y. Office: No. 88 Van Dyke St.

MANHATTAN FIRE BRICK

and Enameled Clay Retort Works.

ADAM WEBER, Proprietor.

Office, **633 E. 15th St., N. Y.** Clay Retorts, Enameled for Gas Houses; Retorts for burning raw bone and re-burning bone for Bone Black. Fire Bricks, Fire Blocks, Cupola and Range Bricks of all shapes and sizes. The best fire clay from my own Clay Beds at Perth Amboy, N. J.

A. HALL & SONS, Perth Amboy, N. J.

ESTABLISHED 1846.

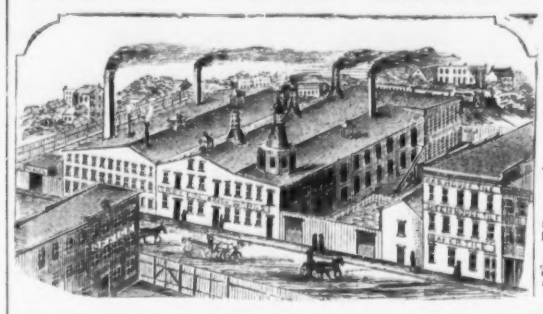
HALL & SONS, Buffalo, N. Y.

ESTABLISHED 1866.

FIRE BRICK

of reliable quality for all purposes, manufactured of the best New Jersey Fire Clays. Also, Architectural Terra Cotta, Fire Clay, Fire Sand, Kaolin, Ground Fire Brick and Diamantine Building Brick.

TROY FIRE BRICK WORKS,



Jas. Ostrander & Son,

Established 1848.

Manufacturers of

FIRE BRICK,

Tuyeres, Tiles, Blast Furnace Blocks, etc.

Miners and Dealers in

Woodbridge Fire Clay and Sand, and Staten Island Kaolin.

Price List, Diagrams of Fire Brick, and all other information cheerfully furnished on application.

TROY, N. Y.

JAMES OSTRANDER.

FRANCIS A. OSTRANDER, Surviving partner.

CUMBERLAND FIRE BRICK WORKS

GARDNER, STUART & CO.,

MANUFACTURERS OF

STANDARD SAVAGE FIRE BRICK.

OFFICE: Room 3, No. 96½ Fourth Avenue, PITTSBURGH, PA.

WORKS: One Mile from Mt. Savage Junction, Md., B. & O. R. R.

Illustrated Circulars and Price Lists on application.

Harvey W. Peace, Vulcan Saw Works.

Manufacturer of every kind of

Patent Ground SAWS.

TRADE MARK. HARVEY W. PEACE & Co.

Circulars, Cross-Cuts, Mill, Mulay, Gang, Hand and Butcher.

Molding and Planing Knives, Plastering Trowels, Mitering Rods, &c.

Union Avenue, Tenth and Ainslie Streets, BROOKLYN, E. D., N. Y.

E. M. BOYNTON,

Manufacturer of all kinds of

First-Class Saws, Saw Frames, Cross-Cut Handles, Tools, Files, &c.

Also Sole Proprietor and Mfr. of the Genuine Patent Lightning Saw,

No. 80 Beekman Street, NEW YORK.

Special attention is called to my new Centennial Saw, patented March 28th, 1876; Special File and Saw-Set combined, patented June 20th, 1876; Cross Cut (Loop) Saw Handle, patented February 15th, 1876; New One-Man Saw, with Patent Double Removable Handle Attachment, March 28th, 1876; New Patent Champion Clearer Tooth, patented August 15th, 1876 Saw Set, patented Nov. 25th, 1873—a perfect Set that a blind man can use to condense like a Hammer Set perfectly; Cross-bar Wood Saw Frame, patented Nov. 12, 1872; also Cross-Cut Handle, with castings, patented Feb. 15, 1870.

These goods complete the scientific tools for cutting timber, instead of wearing it off with notched V teeth (which are like a fractured plate sharpened).

AWARDED CENTENNIAL MEDAL AFTER ACTUAL TEST.

PHILADELPHIA, November 11th, 1876.

REPORT ON AWARDS. GROUP No. 15.

Product: Saws in great variety; special improvement in shape of teeth, called Patent Lightning Saw.
Name and Address of Exhibitor: Eben Moody Boynton, New York.

The undersigned having examined the product herein described, respectfully recommends the same to the United States Centennial Commission for award, for the following reasons, viz:
Report: "Being of very Superior Quality and of great Practical Utility." DANIEL STEINMETZ, Signature of the Judge.

J. D. IMBODEN, of Virginia, CHARLES STAPLES, of Maine, G. L. REED, of Penn., } JUDGES.
J. DIFENBACH, of Germany, DAVID McHARDY, of Scotland, D. STEINMETZ, of Phila. }

A true copy of the record. FRANCIS A. WALKER, Chief of the Bureau of Awards.
Given by authority of the U. S. Centennial Commission.
J. L. CAMPBELL, Sec'y. A. T. GOSHORN Director General. J. R. HAWLEY, Pres't.

E. C. ATKINS. *ESTABLISHED 1857.* H. KNIPPENBERG.

E. C. ATKINS & CO., Indianapolis, Ind.,

Saw Manufacturers and Repairers.

Sole manufacturers of the celebrated

GENUINE SILVER STEEL DIAMOND X CUT SAW.

$1.50 Per Foot.

PATENT HANDLES AND GAUGE INCLUDED.

☞ **BEWARE OF THE IMITATION CALLED "DIAMOND TOOTH."** ☜

Wheeler, Madden & Clemson MFG. CO.,

MIDDLETOWN, - - - - NEW YORK.

Manufacturers of

WARRANTED CAST STEEL

SAWS

Of every description, including

Circular, Shingle, Cross-Cut, Mill, Hand, WOOD SAWS. Etc., Etc.

AMERICAN SAW CO.,

Manufacturers of

Movable Toothed Circular Saws,

PERFORATED CROSS-CUT SAWS

And SOLID SAWS of all kinds. Trenton, N. J.

Patented June 30, 1876.

THE BEST

Burglar Alarm

IN THE WORLD.

Simple in construction, cheap in price, easily applied, and a perfect protection. Price, $1.00. Manufactured

UNITED STATES BURGLAR ALARM CO.,

Principal Depot, No. 107 NORTH NINTH STREET, PHILADELPHIA

Agents wanted, Large Profits allowed. State, city and county rights for sale

New York Wholesale Prices, September 5, 1877.

HARDWARE.

Anvils.
American ₱ lb 15c—dis 20 %
Wright's ₱ lb gold 10½c; over 250 lbs 11c, gold
Armitage's Mouse Hole gold 10 @ 10½c
Wilkinson's ₱ lb gold 11c
Eagle Anvils (American) ₱ lb 9c dis 20 %

Apple Parers.
Bay State Parer, Corer and Slicer ₱ doz $12.00 net
Improved Turn Table ₱ doz 7.50 net
Faultless Turn Table ₱ doz 7.50 net
New Lightning ₱ doz 7.50 net
"Old Reliable" ₱ doz 5.00 net
Climax Corer and Slicer ₱ doz 6.00 net
Lightning Peach Parer ₱ doz 12.00 net

Augers and Bits.
Conn. Valley Mfg. Co.
Douglass Mfg. Co. } 1st quality...dis 50 %
Ives } 2d quality...dis 50&5 %
Beecher (French, Swift & Co.)
Griswold
Nobles Mfg. Co.
Kasson's Patent
Cook's, Douglass Mfg. Co dis 50&5 %
Cook's, Ives' dis 50 %
Snell Mfg. Co dis 30&10 %
Jennings' Bits dis 10 %
Ives' "Jennings" Bits dis 10&10 %
Lewis' Single Twist Bits dis 25&30 %
Andrews Bits dis 50 %
Griswold's Patent Bits dis 30 %
Expansive Bits, Clark's, small, $13; large, $26...dis 20 %
" " Ives'...$30 @ $30—dis 33⅓ %
" " Blake's...$20—dis 40 %
" " Parmelee's...small, $20; large, $36 dis 25 %
Hollow Augers, Ives' } dis 40 %
" " French, Swift & Co. }
" " Bonney's Adjust., ₱ doz $48—dis 25&10 %
" " Stearns' Adjust., ₱ doz $48—dis 25&10 %
" " Ives' Expansive...each $4.50—dis 40 %
" " Univ'sal Expansive, each $4.50—dis 10 %
Gimlet Bits—Screw, $7.50; no screw, $9 dis 40 %
" Diamond ₱ doz $1.00 dis 10 %
Double Cut Gimlet Bits, Shepardson's dis 30 %
" " Ct. Valley Mfg. Co...dis 30&10 %
" " Hartwell's dis 50&10 %
" " Douglass' dis 25&10 %
" " Ives' dis 40 %
Morse's Bit Stock Drill, List of Jan. 1, '76 dis 25 %
L'Hommedieu's Ship Augers dis 15 %
Watrous Ship Augers dis 15 %

Awls, Brad Sets, &c.
Awls, Sewing, Common ₱ gross $1.35—dis 25 %
" Sewing, Best ₱ gross 1.60—dis 10 %
" Shouldered Peg ₱ gross 2.25—dis 15 %
" Patent Peg ₱ gross .60—dis 15 %
" Shouldered Brad ₱ gross $2.70—dis 25&10 %
Brad Sets, Aiken's ₱ doz $12.00—dis 40 %
" No. 42, $10.50; No. 43, $12.50 dis 60 %
" Clark's dis 50 %
" Stanley's Excelsior No. 1, $11.00—dis 25&10 %

Axes.
Ten Eyck Axe Mfg. Co.—
Per doz $11.50, 12.00, 12.50 dis 15&5 %

Axles.
Common (Guy C. Hotchkiss, Field & Co.) ₱ lb 4½c
Solid Collar, Case Hardened, Chilled Box ₱ lb 8c
Axle Grease.—Frazer's ₱ lb 6c

Balances.
Light or "Common" dis 25&10 %
All other Spring Balances dis 25 %

Bands.—Plated new list dis 50&5 %
Iron Rim new list dis 25&5 %
Brass (Plated list) new list dis 50, 10&5 %
Oroide new list dis 50&5 %

Bed Keys.
Gray's Ratchet ₱ doz $4.00 dis 15 %

Bells.
Hand, Light Brass dis. 75 %
" Extra Heavy dis 40&10 %
" White Metal dis 50&10 %
" Silver Chime dis 20&10 %
" Swiss dis 25 %
" Globe (Cone's Patent) dis 20&10 %
Gong, Abbe's dis 20&10 %
" Yankee dis 35&10 %
" Barton's dis 40&2 %
Crank, Taylor's dis 25&10 %
" Brook's dis 50 %
" Cone's dis 10 %
" Connell's dis 50&10 %
Lever, Sargent's dis 60&10&10 %
" Taylor's Bronze or Plated Lever net
" Japanned Lever dis 25&10 %
" Hart, Bliven & Mead Mfg. Co dis 50&10 %
Pull, " " " " dis 50&10 %
" Brook's dis 50 %
" Western dis 25&10 %
Call dis 20 %
Cow, Common Wrought dis 20&10 %
" Western dis 20&10 %
" " Sargent's dis 60&10 %
" Kentucky "Star" dis 20&10 %
" " Sargent's dis 60&10 %
" Dodge's Genuine Kentucky, new list—
Nos. 0 1½ 2 3 4 5 6 Hog.
$12.00 10.00 9.00 8.00 6.00 5.00 3.50 2.50 5.00, dis 50 %
" Yaw's Genuine dis 50 %
" Texas dis 40 %

Bellows.
Blacksmiths', Common dis 20 @ 25 %
" Extra and Pittsburgh Pattern...dis 20 %
Moulders' dis 25 %
Hand Bellows dis 20 %

Blind Adjusters.—Domestic ₱ doz $3.00, dis 20 %

Blind Fasteners.
Mackrell's dis 30 %
Van Sand's No. 2000, $14.00, dis 25 %
" old pattern ₱ gross, $10.50, dis 5 %
Washburn's Patent ₱ gross $14.00, dis 25 %
Merriman's new list net
Security Blind Fast ₱ gross $14.00, dis 10 @ — %

Blind Staples.
Boardman's Patent, ½ in. and larger ₱ lb 41c. dis 10&5 %
" ¾ in. ₱ lb 40c. dis 10&5 %

Blocks.
Differential Pulley Blocks dis 20 %
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list dis 30&10 %
Stanley Rule and Level Co dis 25&10 %

Blowers.
Keystone Portable Forge Co dis 20 %

Bolts.
Cast Iron Barrel, Shutter, &c dis 60&10&10 %
Cast Iron Chain dis 60&10&10 %
Wrought Iron Barrel dis 50, 10&10 %
" " Square dis 50, 10&10 %
" " Shuter (Stanley's list) dis 50 %
" " " (Sargent's new list). dis 50, 10&10 %
" " Flush, Stanley's dis 15&10 %
" " Sargent's dis 50&10&10 %
Carriage and Tire, Common dis 75&3 % cash
" " Norway Iron dis 50&10 %
" " R. B. & W. (old list) dis 05 %
" " Philadelphia dis 60&10 %
" " Colema dis 60&10 @ 60&20 %
" " Shelton's (old list) dis 65&5 %
Star (Phila) dis 60&10&60&20 %
Union Nut Company, old list dis 60&5 %
Stove—American Screw Co.'s dis 45 @ 50 %
" R. B. & W. dis 50 %
" Shelton's Shaved Head dis 45 @ 50 %
" Union Nut Co. dis 45 %

Union Mfg. Co.'s Fancy Butts—
Figured Enameled Loose Joint dis 65&10 %
Boston Finish, Plain dis 80&10 %
" " with Iron Acorns dis 75&10 %
" " with Silvered Acorns dis 60&10 %

WROUGHT IRON.

Fast Joint, Narrow dis 40&10 %
" Lt. Narrow dis 40&10 %
" Broad dis 40&10 %
Loose Joint, Broad dis 40&10 %
Table Butts, Back Flaps, &c dis 35&10 %
Inside Blind, Regular dis 35&10 %
" " Light dis 40&10 %
Loose Pin, Wrt dis 40&10 %
Am. Spiral Spring Butt Co., Japanned dis 25 %
" " " Fancy dis 10 %
Sabin Mfg. Co., Double Acting dis 35 %
Union Spring Hinge Co dis 25 %
" Mfg. Co. Spring Hinges dis 25 %
Blind Butts, Parker dis 70&10 %
" Palmer dis 40&10 %
" Seymour dis 60&10 %
" Shepard dis 60 %
" Lull & Porter dis 60 %
" Nicholson dis 45&10 %
" Huffer dis 33⅓&10 %
" Garretson dis 60 %
" Clark's, Nos. 1, 3, 5, 40 and 50 dis 60 %
" " Nos. 2, 4, 4½, 6, 8, 10 dis 50&10 %
" Sargent's dis 70&5&10 %

Can Openers.
Messenger's Comet ₱ doz $3.00, dis 20 %
American ₱ doz $2.25, dis 50&5 %
Lyman's ₱ doz $2.75, dis 20 %
No. 4, French ₱ doz $2.25, dis 50 %
No. 5, Iron Handle ₱ doz $2.25, dis 50&5 %
Sprague's

Nos.	1	2	3	
₱ doz	$2.00	2.25	2.50	dis 25 %

Eureka ₱ doz $2.50, dis 10 %
Sardine Scissors ₱ doz $7.00, dis 40 @ 40&5 %
Star ₱ doz $5.00, dis 25 %

Caps—Percussion, ₱ 1000.
Hicks & Goldmark's G. D. & S. R. 37 @ 40c
" " E. B. 1-10 Ground 70c, dis 6 %
" " E. B. 1-10 Turned 65c, dis 5 %
" " D. W. P. 1-10 $1.40, dis 5 %
" " D. W. P. ¼ 1.35, dis 5 %
" " Colt's 1-10 70c, dis 5 %
Ely's E. B. 1-4s, 58c.; 1-10s, 70c. gold
" Double Waterproof, 1-4s, $1.50; 1-10s, 80c. gold
Colt's 1-10s, 80c, gold
" Cartridges.—Metallic dis 62½ %

Cards.—Horse and Curry dis 30&10 %
Cotton dis 10&10 %
Wool dis 15&10 %

Carpet Stretchers.
Cast Steel, Polished ₱ doz $5.00, dis 30 %
" Iron, Steel Points ₱ doz $2.00, dis 45&5 %

Casters.
Bed dis 55 %
Plate and Shallow Socket dis 55 %
Deep Socket dis 40 %

Cattle Leaders.
Hotchkiss' Sons' dis 10&10 %
Humason, Beckley & Co.'s dis 60&10 %
Sargent's dis 60&10 %
Union Nut Co dis 60&5 %

Chains.
Trace, 6½-10-2 by the cask, ₱ pair, gold, 50 @ 52c
" 7-10-2 by the cask, ₱ pair, gold 55 @ 57c
German Halter Chain dis 30&5 % gold
" Coil dis 30&5 % gold
Galvanized Pump Chain ₱ lb 10½c
Jack Chain, Iron dis 55&10 %
" Brass dis 45&10 %

Chalk.
White ₱ gross 55c net
Red ₱ gross 75c net
Blue ₱ gross 90c net
White Crayons ₱ gross 13½c net

Chisels.
D. R. Barton Tool Co. (all kinds) dis 20 %
Socket Framing, Crossman dis 60&10&10 %
" " Buck Bros...new list, dis 17½ @ 20 %
" " Hart Mfg. Co., No. 1 dis 65&5&10 %
" " Merrill dis 60&10 %
" " Witherby Tool Co dis 60&10 %
" Firmers, Crossman dis 60&10 %
" " Buck Bros...new list, dis 17½ @ 20 %
" " Hart Mfg. Co., No. 1 dis 65&5&10 %
" " Merrill dis 60&10 %
" " Witherby Tool Co dis 60&10 %
" Corner dis 65&70 %
Tanged Firmers " extra dis 40 %
" " Butcher's $5.00 @ $5.25 to £ gold
" " Newbould's 5.50 to £ gold
" " Spear & Jackson's 5.00 to £ gold
" " Buck Bros (Shank) 5.25 to £ gold

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron dis 25 %
" Adjustable, Gray's dis 20 %
" " Lambert's dis 20 %
" " Snow's dis 40&5 %
" " Hammer's dis 15 %
" Cabinet, Sargent's dis 60&10 %
" Carriage Makers', Sargent's dis 60&10 %

Coffee Mills.
Board and Box dis 25 %
Increase Wilson's dis 25 %
Selsor's Pat. $9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.) dis 20 %
French Steel dis 20 %
The Swift dis 25 %

Compasses and Dividers dis 35&10 %
Bemis & Call Co.'s dis 35&10 %
Cook's dis 15 %
Excelsior dis 40 %
Miller's Patent dis 25&10 %

Coopers' Tools.
Bradley's dis 15 @ 20 %
Chas. E. Littie dis 20 @ 25 %
D. R. Barton Tool Co dis 20 %

Corkscrews.—Humason & B dis 33⅓ %

Corn Knives and Cutters.
Bradley's dis 10 %

Crow Bars.
Cast Steel ₱ lb 9c net
Iron, Steel Points ₱ lb 5c

Crucibles.—Gautier & Co ₱ No. 5340

Curling Irons, &c.
⅛, ⅝, ¾ in., $1.80, 2.00, 2.40 dis 10 %
Curling Tongs ₱ doz $6.50, dis 15 %
Pinching Irons ₱ doz 7.50, dis 20 %

Curry Combs.
Curry Comb Mfg. Co dis 25&10 %
Fitch's (List of No. 240, $1) dis 70&10 %
Hotchkiss' & Kellogg's, Iron & Brass, old list. dis 40&7½ %
Hotchkiss' Novelty dis 10&10 %
Rubber ₱ doz $9.00, dis 15 %
Wood Tooth (Fuller Bros.) ₱ doz $2.25, net

Clips, Axle.
Norway or Best dis 50 %
Superior dis 55 %

Cockeyes...1¼ in., 28c.; 1½ inch, 33c.; 1¾ in., 37c. net

Cocks.
Brass Racking dis 50 %
Lock and Globe dis 50 %
Lever Bibbs dis 50 %
Ale and Beer dis 40&15 %

Curtain Pins.—Silvered Glass...new list, dis 15 %

Cutlery.
Meriden Cutlery Co. (Table) net
Am. Miller Bro.'s Cutlery Co dis 25 %
Naugatuck Cutlery Co list net
New York Knife Co. (Pocket) dis 40 %
" " (Table) net
Rogers Cutlery Co net
Humason & Beckley Mfg Co dis 25 %

Dippers.
Britannia ₱ doz $3.75 @ $4.25, net
Cocoa, Plain ₱ doz $3.25, dis 20 %
" Rimmed ₱ doz 3.75, dis 20 %

Dog Collars.
Embossed Gilt dis 20 %
Leather dis 30 %
Brass dis 25 %

Door Springs.
Torrey's Rod ₱ doz $2.00 @ $2.10, net
Gray's ₱ doz $2.00, net
Johnson's Rod ₱ doz 3.00, net
Gem (Coil)—
No. 1, Large, Japanned ₱ doz $3.50
No. 2, Medium, " ₱ doz 2.50 } dis 10 %
No. 4, Small, " ₱ doz 2.0
Challenge (Coil)— Nos. 9 7 6
Japanned ₱ doz $2.00 2.50 3.50
Coppered ₱ doz 4.00 4.50 5.00 } dis 15 %
Galvanized ₱ doz 3.50 4.00 4.50
Nickeled ₱ doz 5.50 6.00 7.00
Premium (Coil)— Nos. 1 2 3
Japanned ₱ doz $7.50 6.25 5.00 } dis 30 %
Nickeled ₱ doz 11.00 9.50 8.00
Star (Coil)—For Cop'd, Nickel-Plated, &c., see list.
No. 5, Small ₱ doz $2.00
No. 6, Medium ₱ doz 2.40 } dis 15 %
No. 7, Large ₱ doz 3.00
Philadelphia 5 in., $5.00; 8 in., $7.00, dis 25 %
Barker's Concealed dis 25 %

Drawing Knives.
Crossman's No. 1 dis 60&10 %
D. R. Barton Tool Co dis 20 %
Hart Mfg. Co., No. 1 dis 60&25&10 %
Merrill dis 60&10 %
Nobles Mfg. Co dis 15 %
Bradley's dis 25 %
Adjustable Handle dis 20 %
Witherby Tool Co dis 60&10 %

Drills and Drill Stocks.
Blacksmiths' each $2.10 @ $2.25
" Self-Feeding each $7.50, dis 10 %
Breast, P. S. & W dis 25 %
Breast, Aiken's dis 25&10 %
" Hotchkiss dis 10 %
" Wilson's dis 10 %
" Miller's Falls each $2.50, dis 25 %
Ratchet, Merrill's dis 20 %
" Ingersoll's (old list) dis 35 %
" Whitney's dis 20 %
" Weston's dis 20 %
" Moore's Triple Action dis 20 @ 25 %
Wilson's Drill Stocks dis 10 %
Automatic Boring Tools each $2.75, dis 20 %

Drill Chucks.
Danbury each $8.00, dis 30 %
Morse's Beach Patent dis 30 %
" Adjustable each $10.00, dis 30 %

Egg Beaters.
Dover ₱ doz $5.00, dis 20 %
National ₱ doz $4.50, dis 33⅓ %
Schofield ₱ doz $3.50

Emery.
Genuine Chester—Regular Nos ₱ lb 6c
" " Flour and FF ₱ lb 4c } dis 10 %

Washington Mills—Regular Nos ₱ lb 8c
" " Flour ₱ lb 5c
Wellington Mills, Grain ₱ lb 10c net
" " Flour ₱ lb 8c net

Enameled and Tinned Ware.
Kettles dis 40 @ 50 %
Sauce Pans dis 30 @ 35 %
Glue Kettles dis 30 @ 35 %
Tinned Sauce Pans dis 30 @ 35 %

Escutcheons.
Door Lock Same discounts as Door Locks
Brass Thread dis 60&10 %
Wood dis 25 %

Faucets.
Fenn's dis 50 %
Fenn's Cork Stops dis 40 %
Star dis 55&10 %
Frary's Patent Petroleum dis 20&10 %
Wood and Metallic dis 40 %
" Cork Lined dis 65&10 %
Enterprise Mfg. Co., Self-Measuring dis 20 %

Felloe Plates ₱ lb 15c, dis 40&10 %

Files.
American File Co $5.00 to £ currency, dis 40 %
Arcade File Works $5.00 to £ currency
Auburn " 5.00 to £ currency
C. B. Paul's 5.00 to £ currency
Heller & Bros 4.50 to £ currency
Hiscox File Mfg. Co. $5.00 to £ currency, dis 15 %
Johnson & Bro $5.00 to £ currency
Madden & Cockayne File Co $5.00 to £ cur., dis 15 %
Jowitt's $4.50 to £ gold
J. & Riley Carr 4.50 to £ gold
Stubs' 7.50 to £ gold
Butler's 4.50 to £ gold
Walter Spencer & Co.'s "Diamond" 4.50 to £ gold
Fisher's 4.75 to £ gold
Moss & Gamble 4.75 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.) 4.50 to £ gold
" " Horse Rasps 4.75 to £ gold
H. Disston & Sons (new list) dis 30 %
Limet & Co. (French) $4.25 to £ gold
Boyton's Cant dis 40 %

Fluting Machines.
Mrs. Knox, No. 1876 each $2.75 to $3.00 net
Knox Imperial, 1877 $5.20, dis 30&10&10 %
Knox, 4-inch Rolls $2.50 each net
" 6 " " 3.00 each net
" 8 " " 4.50 each net
Peerless, 4-inch Rolls 4.00 each net
" 5 " " 4.75 each net
Improved Knox (Climax), 4-inch 2.05 each net
" " 6 " 3.15 each net
" " 8 " 4.90 each net
Eagle, 3¼-inch Roll 18.00 ₱ doz net
" 5½ " 24.00 ₱ doz net
Empire 4.00 each net
Eureka, No. 1, 7-inch Roll 6.75 each net
" No. 2, 5-inch Roll 5.00 each net
Crown, 4½-in. Roll, $2.50; 6-in., $3.00; 8in., 4.25 each net
Domestic Fluter 1.50 each net
Geneva's Hand Fluter 15.00 ₱ doz net
Combined Fluter and Sad Iron ₱ doz 15.00, dis 10 %

Fluting Scissors dis 35&10 %

Forges.
"Empire" (W. P. Kellogg & Co.) dis 20 %
Keystone Portable Forge Co dis 20 %

Forks.
Hay, Manure and Spading dis 35 %
Plated A 1 dis 40&5 %
" Reed & Barton dis 40&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co dis 20 %

Fry Pans.
Burnished, P. S. & W., new list dis 60 %

No.	0	1	2	3	4	5	6	7	8
₱ doz	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

Gauges.
Marking dis 45&10 %
" Star dis 35 %
Wire dis 10 %
" Smith's Patent ₱ doz $18.00, dis 40 %

Gimlets.
Nail and Spike dis 40 %
"Bee" Gimlets ₱ gross $12.00, dis 45 %
"Eureka" Gimlets dis 40 %
Double Cut, Shepardson's dis 20 %
" " Hartwell's dis 40 %
" " Ives' dis 33⅓ %
" " Douglass' dis 25&10 %

Glue Pots.
Tinned and Enameled dis 35 @ 40 %
Family, Howe's "Eureka" dis 25 %
" L. F. & C.'s "Handy" dis 25 %

Grindstone Fixtures.
Sargent's Patent dis 70&10&10 %
Reading Hardware Co (New list) dis 40&10 %
Hart Mfg. Co., Nos 9 to 11 dis 75&7½&10 %
Rick Bros dis 45&5 %

Hammers.
Humason & Beckley Mfg. Co dis 33⅓ %
Maydole's (New list, Jan. 1, '77) dis 15 %
Henry Hammonds' (New list, Jan. 1, '77) dis 15&5 %
Cheney's Steel Face and Claw dis 10 %
" all Steel dis 20&10 %
Verree dis 5 %
Magnetic Tack dis 25&10 %
Warner & Noble's dis 10 %

Hand Cuffs and Leg Irons.
Tower's Hand Cuffs, $4.00 ₱ pair } dis 25 %
" Leg Irons, $6.50 ₱ pair }
Providence Tool Co.'s Hand Cuffs, $15.00 ₱ doz } dis 10 %
" " Leg Irons, $25 ₱ doz }

Handles.
Door or Thumb Latches—
Nos. 0 1 2 3 4
Per doz...$2.80 1.00 1.18 1.35 1.50...dis 60&10 %
Roggin's Latches 35c @ 40c net
Bronzed Iron Drop Latches ₱ doz $1.00 @ $1.25 net
Wrought Chest dis 60&10 %
Surface Chest, Sargent's list dis 60&10&10 %
Flush Chest dis 60&10&10 %
Lifting dis 60&10 %
Saw and Plane dis 25&10 %
Boynton's X Cut (Loop) dis 20 %
" (Centennial) dis 15 %
Hammer and Hatchet dis 10 %
North Carolina Handle Co dis 15 %
Brad Awl ₱ gross $3.75, dis 25&10 %
Hickery Firmer Chisel, assorted, ₱ gross $6.25
" " " large, " 6.50
Apple " " assorted, " 6.50
" " " large, " 7.50
Socket " " assorted, " 4.50 } dis 40 %
" Framing " assorted, " 7.00
File, assorted, ₱ gross 3.50
Auger, assorted, ₱ gross 6.00
" large, " 7.00
Patent Auger, Ives' dis 25&10 %
" Douglass' ₱ set $1.25, dis 10 %
" Swan's ₱ set $1, dis 20&10 %

Hangers.
Barn Door dis 70&10 %
"Anti-Friction," No. 1, $1.25; No. 2, $1.50 ₱ pr., dis 40&10 %
Novelty dis 40 %
Challenge dis 50 %
Climax dis 40 %

Harness Snaps.
Henshaw's...List of 1½ changed to $14.00, dis 45 @ 50 %
Judd's " " " 14.00, dis 50 %
Fitch's (Bristol) " " " 14.00, dis 45&50 %
Hotchkiss' dis 10 %
Andrews' dis 45 %
Sargent's dis 60&10 %
New York Wire dis 20&20 %
"German" dis 50 %

Hatchets.
Isaiah Blood dis 15 %
Shingling, Nos. 1 2 3 ₱ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 ₱ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 ₱ doz 7.50 8.00 8.50
Hunt's dis 25 %
Shingling, Nos. 1 2 3 ₱ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 ₱ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 ₱ doz 7.50 8.25 9.00
Hurd's dis 30&10 %
Shingling, Nos. 1 2 3 ₱ doz $8.00 $8.50 $9.00
Claw, Nos. 1 2 3 ₱ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 ₱ doz 8.00 8.50 9.00
Simmon's dis 35 %
Shingling, Nos. 0 1 2 3 ₱ doz $7.50 $8.00 $8.50 $9.00
Claw, Nos. 1 2 8 ₱ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 ₱ doz 8.00 8.50 9.00
Broad, Nos. 1 2 3 4 ₱ doz 9.00 10.00 12.00 14.00
" Nos. 5 6 7 8 ₱ doz 16.00 18.00 20.00 22.00
Collins' dis 10 %
Shingling, Nos. 1 2 3 ₱ doz $6.00 $6.50 $7.00
Claw, Nos. 1 2 3 ₱ doz 6.50 7.00 7.50
Lathing, Nos. 1 2 3 ₱ doz 6.00 6.50 7.00
Ten Eyck Axe Mfg. Co dis 35 %
Shingling, Nos. 1 2 3 ₱ doz $8.00 $8.50 $9.00
Lathing, Nos. 1 2 3 ₱ doz 8.00 8.50 9.00
Claw, Nos. 1 2 3 ₱ doz 9.00 9.50 10.00
Broad, Nos. 3 4 5 ₱ doz 13.00 14.50 16.90
" Nos. 6 7 8 ₱ doz 18.00 19.50 22.00
" No. 9 ₱ doz 25.00
D. R. Barton Tool Co dis 20 %
Shingling, Nos. 1 2 3 ₱ doz $11.00 $10.50 $10.00
Lath, Nos. 1 2 3 ₱ doz 10.50 10.00 9.50
Half Hatchets, Nos. 1 2 3 ₱ doz 11.00 10.50 10.00
J. P. Perree & Co dis 5 %
Shingling, Nos. 1 2 3 ₱ doz $7.00 $7.50 $8.00
Claw, Nos. 1 2 3 ₱ doz 7.50 8.00 8.50
Lathing, Nos. 1 2 3 ₱ doz 7.00 7.50 8.00
Underhill's dis 20 %
Shingling, Nos. 1 2 3 ₱ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 ₱ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 ₱ doz 12.00 11.00 13.00
M. H. Jones & Co dis 25 %
Shingling, Nos. 1 2 3 ₱ doz $8.00 $8.50 $9.00
Half Hatchets, Nos. 1 2 3 ₱ doz 8.00 8.50 9.00
Claw, Nos. 1 2 3 ₱ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 ₱ doz 8.00 8.50 9.00
Broad, Nos. 2 3 4 ₱ doz 11.00 13.00 14.50
" Nos. 5 6 7 ₱ doz 16.50 18.00 19.50
Empire Hatchets, M. H. Jones & Co net
Shingling, Nos. 1 2 3 ₱ doz $4.75 $5.00 $5.25
Lath Nos. 1 2 3 ₱ doz 4.75 5.00 5.25
Half Hatchets, Nos. 1 2 3 ₱ doz 4.75 5.00 5.25
All pol. Sh'gling, Nos. 1 2 3 ₱ doz 5.25 5.50 5.75
Solid Steel Lath, Nos. 1 2 3 ₱ doz 7.25 8.50 7.75

Hay Knives.
"Lightning" ₱ doz $20.00 net
Wadsworth's dis 30 %

Hinges.
Gate, Western ₱ doz $6.25, dis 60&10 %
" N. E. ₱ doz $10.13, dis 60&10 %
" N. Y. State ₱ doz $7.20, dis 60&10&10 %
" Clark's No. 1 ₱ doz $6.00, dis 45 %
Rolled Plate dis 60&10 %
Rolled Raised dis 60&10 %
Wrought Strap and T dis 50 %
Providence Plate } 6 to 10 in. 11c ₱ lb } dis 60&10 %
" " Flour and FF } over 10 in. 9½c ₱ lb }

Screw Hook and Strap { 8, 10, 12 in., 11c / 14 to 36 in., 9½c } dis 40&10 %
Heavy Welded Hook { 8 to 12 in., 11 c / 14 in. & up, 9½c } dis 30 %
Screw Hook and Eye { ⅝ to 1 in., 11 c / ⅝ in. 12½c / ⅞ in. 13 c } net

Hoes.
Solid Shank, C. S. ₱ doz $8.00, dis 40 %
Socket ₱ doz 9.00, dis 40 %
Riveted Eye ₱ doz 4.75, dis 40 %
Grub dis 30 %
Planters' dis 20 @ 25&10 %
Scovill Pattern dis 20 @ 30 %
Lane's C. S. Crescent Planters, Amer. Pat'n. dis 20&5 %
" Scovill Pattern dis 20 %
Handled Solid C. S. Shank dis 35 %
Planters', Handled dis 35 %
Scovill Pattern, Handled dis 35 %

Hooks.
Bird Cage, Sargent's list dis 60&10 %
Cotton dis 50 %
Belt dis 60&10 %
Bench—Hotchkiss', $5.00 ₱ doz dis 10 %
" Weston's, No. 1, $8.00; No. 2, $7.00 ₱ doz net
" McGill's, $3.00 ₱ doz dis 10 %
" Skinner's, $6.25 per doz dis 20 %
Clothes Line, Hart's list dis 60&10&5&10 %
" " Sargent's list dis 60&10&10 %
" " Reading list dis 33⅓&5&10 %
Ceiling { Hart's list dis 70&10 %
Harness { Sargent's list dis 60&5&10 %
" Reading list dis 40&10 %
" Monroe's Patent ₱ doz $4.00, dis 20 %

Ladles.
Melting—Hart's dis 55&10 %
" Sargent's dis 50&10 %
" Reading dis 15&10 %
" Monroe's Patent ₱ doz $4.00, dis 20 %

Lanterns.
Tubular No. 0, $10.00; No. 1, $12.50 } net
" With Guards, 50c extra. }
Peerless No. 5, ₱ doz $11.75, dis 10&10 %
Brady's Patent dis 10&10 %
Ætna dis 10&10 %
Yankee dis 10&10 %
De Beque dis 10&10 %
Police Small, $7.50; Large, $9.00, dis 5 %

Lard Presses.
Draw Cut, 14 inch each $65.00, dis 20 %
Enterprise Mfg. Co dis 20 %

Lemon Squeezers.
Porcelain Lined ₱ doz $6.00 net
Eureka, Tinned ₱ doz $10.00, dis 10 %
Dunlap's Improved ₱ doz $6.00 net
Sammis' Patent No. 1, $7.50; No. 2, $12.00 ₱ doz dis 25&10

Lines.
Linen Wash dis 20 %
Coon Chalk dis 50 %
Sil. Lake Chalk Nos. 0, 1, 2, 3, $6.00, $6.50, $7.00, $7.50 dis 20 %
Mason's dis 20 %
Wire Clothes, Gal'd each 50c net

Locks and Latches.
Cabinet—Gaylord } dis 25&2 %
" Eagle... }
Trunk dis 25 %
Langstroth & Crane's List Jan. 1, '77.
Round Key dis 40&10 %
Flat Key dis 33⅓&10 %
Barnes & Deitz, Flat Key dis 25&30 %
Yale Lock Co., Flat Key dis 40 %
Sargent & Greenleaf, Flat Key dis 35&40 %
Continental dis 25 %
Shepardson's, Flat Key dis 35 %
American Lock Mfg. Co dis 33⅓ %
Plate dis 33⅓&2 %

DOOR LOCKS, &C.

Branford dis 60&10&2 %
Norwalk dis 50&10&2 %
Russell & Erwin dis 60&10&2 %
P. & F. Corbin dis 40&25&5&7½ %
Mallory, Wheeler & Co. dis 35&10&2 %
Padlocks—Russell & Erwin { dis 33⅓&5 %
" Mallory, Wheeler & Co... } and 2 % for cash
" Wm. Wilcox & Co...
" American Lock Mfg. Co dis 33⅓ %
" Romer's dis 15 %
" Vulcan Hardware Co dis 20 %
" New York Lock Co dis 20 %
" J. H. McWilliams dis 30 %
" Barnes & Dietz dis 30 %
" Miller's Patent dis 40 %
" Penn Lock Works dis 33⅓ %
" (Scandinavian) dis 50 %

Mallets.—Hickory and Lignumvitæ dis 20 %

Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 2 3 4
₱ doz...$14.00 17.00 19.00 30.00—dis 25 %
Miles' Challenge Nos. 1 2 3
₱ doz...$22.00 30.00 40.00—dis 30 %
Perry's Nos. 1 2 3 4 4 F'rd 5 g'rd
Each...$5.00 4.00 5.00 11.00 13.00 30.00—dis 20&10 %
Woodruff's (P. S. & W.) Nos. 100 150
₱ doz...$15.00 18.00—dis 20&10 %
Hales' Nos. 11 12 13
₱ doz...$33.00 40.00 51.00—dis 50&2 %
Draw Cut Nos. 5 2 6 8 10
Each...$50.00 75.00 80.00 225.00 400.00—dis 20 %
American dis 25 %
Nos. 1 2 2½ 3 4 B 5
Each $5.00 7.50 10.00 12.00 25.00 50.00 60.00

Molasses Gates.
Stebbins' Pattern dis 62½&10 %
" Genuine dis 60&10 %
" Tinned Ends dis 40&10 %
Bush's dis 20 %
Lincoln's Genuine dis 62½&10 %
Weed's dis 15 %

Mortars and Pestles.
Iron net
Mortising Machines each $20.00, dis 20 %

Nail Pullers.
Taft's ₱ doz $24.00 net
Nails. See Trade Report

Nuts and Washers.
Square and Hexagon, new List March 1, '76...8c off list

Oakum.
Best ₱ lb 10½c
U. S. Navy ₱ lb 9½c
Navy ₱ lb 8½c

Oilers.
Zinc and Tin new list, dis 45 %
Brass and Copper new list, dis 40 %
Olmsted's dis 40 %
Broughton's dis 40 %
Malleable ₱ doz $5.00, dis 10 %
Prior's Patent or "Paragon" dis 45 %
Ox Balls dis 60&10 %

Pencils.
Faber's Carpenters' net
" Round Gilt ₱ gross $6.00 net
Dixon's Lead ₱ gross 4.50 net
" Lumber ₱ gross 9.00 net

Picture Nails and Knobs.
Brass Head, Sargent's List dis 60&10 %
Porcelain Head " dis 60&10&10 %
Pinking Irons ₱ doz $2.75, dis 65&10 %

Plaiting Machines.
Astor Plaiting Machine each $15.00, dis 20 %

Planes and Plane Irons.
First Quality dis 35&33&10 %
Second " dis 50&10 %

Screw Hook and Strap { 8, 10, 12 in., 11c / 14 to 36 in., 9½c } dis 40&10 %
Heavy Welded Hook { 8 to 12 in., 11 c / 14 in. & up, 9½c } dis 30 %
Screw Hook and Eye { ⅝ to 1 in., 11 c / ⅝ in. 12½c / ⅞ in. 13 c } net

Hoes.
Solid Shank, C. S. ₱ doz $8.00, dis 40 %
Socket ₱ doz 9.00, dis 40 %
Riveted Eye ₱ doz 4.75, dis 40 %
Grub dis 30 %
Planters' dis 20 @ 25&10 %
Scovill Pattern dis 20 @ 30 %
Lane's C. S. Crescent Planters, Amer. Pat'n. dis 20&5 %
" Scovill Pattern dis 20 %
Handled Solid C. S. Shank dis 35 %
Planters', Handled dis 35 %
Scovill Pattern, Handled dis 35 %

Hooks.
Bird Cage, Sargent's list dis 60&10 %
Cotton dis 50 %
Belt dis 60&10 %
Bench—Hotchkiss', $5.00 ₱ doz dis 10 %
" Weston's, No. 1, $8.00; No. 2, $7.00 ₱ doz net
" McGill's, $3.00 ₱ doz dis 10 %
" Skinner's, $6.25 per doz dis 20 %
Clothes Line, Hart's list dis 60&10&5&10 %
" " Sargent's list dis 60&10&10 %
" " Reading list dis 33⅓&5&10 %
Ceiling { Hart's list dis 70&10 %
Harness { Sargent's list dis 60&5&10 %
" Reading list dis 40&10 %
Coat and Hat, Hart's list dis 65&5&10 %
" " Sargent's list dis 60&10&10 %
" " Reading dis 40&10 %
Wrought Staples and Hooks and Staples dis 75 %
" Staples, Stanley's list dis 40 %
Wire Screw Hooks and Eyes dis 70&5&10 %
Grass dis 30 %
Whiffletree—Patent dis 45 %
Hooks and Eyes—Malleable Iron dis 60&10&10 %
" "

Machine, Flat Head, Iron, Am. Screw Co.....dis 10 %
" Round Head, Iron, " " .....net
Nettlefold's Brass.....dis 60 @ 60&5 %
Bench, Iron.....dis 60&10&10 %
" Wood, Beach.....₱ doz $3.00, net
" " Hickory.....dis 20&10 %
Hand.....dis 25&10 %
Hand Rail, Sargent's.....dis 55&10 %
" " Humason, Beckley & Co.'s.....dis 40&5 %
Jack, Bell Bottom.....dis 15 %

Scythes.

Blood's German Steel, Grass.....₱ doz $10.00
" Cast, " " .....₱ doz 11.00
" Silver " " .....₱ doz 12.00
" German " Grain.....₱ doz 14.00
" Cast " " .....₱ doz 15.00
" Excelsior and Granger..₱ doz 11.00
" Young America..... 10.50
" Silver Clipper..... 13.00
} dis $1.50 from list
} dis $1.50 from list
Wadsworth's Grass.....dis 30 %
" Bush.....dis 20 %
Scythe Snaths.....dis 20 %

Shears and Scissors.

Cast Steel.....dis 75 & 10 %
" Iron.....dis 55 %
Seymour's Straight Trimmers.....dis 65 %
" Scissors.....dis 50 %
Pruning.....₱ doz $5.50 @ $6.00, net
Barnard's Lamp Trimmers.....₱ doz $3.75

Sheaves.

Sliding Door, M. W. & Co., list.....dis 35&10&2 %
" R. & E. list.....dis 50&2 %
" Patent Roller.....dis 25&20 %
" " Hatfield's.....dis 50&2 %
" Russell's Anti-Friction.....dis 50&2 %
Sliding Shutter, R. & E. list.....dis 50 %
" " Sargent's list.....dis 55&10 %
Moore's Anti-Friction.....dis 33⅓ %

Shovels and Spades.

Ames.....dis 30 %
Rowland's.....dis 50 %
Kimball Shovel Co.....dis 20 @ 20&5 %
Old Colony.....dis 30 %
Middleboro' Shovel Co.....dis 30 %
Remington's (Lowman's Patent).....dis 30 %
Dunning's Shovels and Scoops.....dis 20&7½ %

Shovels and Tongs.

Iron and Brass Head, R. & E. list.....dis 50&2 %
" " Hart's.....dis 55&10 %
Polished Steel.....dis 50&2 %

Slates.

Square Frames, Round Cornered, by case.....dis 70 %
Less than a case.....dis 65&10 %

Spokes.

North Carolina Handle Co.....dis 20 %

Spoke Shaves.

Defiance Metallic.....new list, dis 25&10 %
Iron.....dis 33⅓&10 %
Wood.....dis 30 %
Bailey's.....dis 25&10 %

Spoke Trimmers.

Bonney's.....₱ doz $10.00, dis 40 %
Stearn's.....₱ doz $10.00, dis 40 %
Ive's..... No. 1, $15.00; No. 2, $12.00 ₱ doz, dis 33⅓&10 %
Douglass'.....₱ doz $9.00, dis 25&10 %

Spoons.

Tinned Iron.....dis 10 %
By the case.....dis 20 %
Basting.....dis 10 %
Britannia.....dis 55 @ 60 %
" Boardman's.....dis 55 %
Derby Silver Co.....dis 40&5 %
Rogers & Bro., A 1.....dis 40 %
Reed & Barton.....dis 40&5 %
Rogers Cutlery Co.....dis 40&5&5 %
Hall & Elton.....dis 40&5 %
Holmes, Booth & Haydens.....dis 40&5 %
German Silver (Hall & Elton).....dis 25 %
Tin (P. S. & W.), Teas.....$1.40 ₱ gross, net
" " Tables.....$2.50 ₱ gross, net
Tin (Cowles Hdw. Co.).....dis 10 %
" " " case lots.....dis 20 %

Stocks and Dies.

.....dis 5&10 %

Stone.

Hindostan Stone.....₱ ℔ 6c
" Ax Stone.....₱ ℔ 8c } dis 25&10 %
" Slips.....₱ ℔ 10c
Sand Stone.....₱ ℔ 6c, dis 25&10 %
Washita Stone.....No. 1, ₱ ℔ 30c, net
" " No. 2, ₱ ℔ 25c, net
" Slips.....No. 1, ₱ ℔ 60c, net
Arkansas Stone.....No. 1, ₱ ℔ $1.35, net
" Slips.....No. 1 ₱ ℔ $2.50, net
Grindstones, Family, Loring's.....dis 10 %

Stove Polish.

Joseph Dixon's.....₱ gross $6.00, dis 5 %
Gem.....₱ gross $4.50, dis 5 %
Gold Medal.....₱ gross $6.00, dis 25 %
Rising Sun.....₱ gross $5.75, net

Squares.

Steel.....dis 50 %; full cases, dis 50&10 %
Iron.....dis 50 %; full cases, dis 50&10 %
Nickel Plated.....add $2.50 @ $4.00 ₱ doz, net
Try Squares and T Bevels.....dis 45&10 %
Star Try Squares and Bevels.....dis 35 %
Disston's Try Squares No. 1.....dis 30 %
" " No. 2.....dis 45 %
" " Improved, Nos. 1 and 2.....dis 30 %
Winterbottom's Try and Miter.....dis 20&10 %

Tacks, Brads, &c.—List of January 1, 1876.

Tacks, Half Weight, American.....dis 75&20
" Full " " .....dis 50&20
" Hat " Swedes.....dis 65&20
" Full " " .....dis 30&20
" Carpet, Am. and Swedes..dis 20&20
" " Leather Head.....dis 20
" Copper.....52c, dis 20
Brads, Half Weight.....dis 50&20
} dis 10 % for cash
Shoe Nails—
4-8ths and longer, 9c; 3½-8ths, 9½c ₱ ℔, dis 20&10 %
Trunk, Clout and Finishing Nails—

⅛	⅝	¾	⅞	1	1¼ in. and over.
25	20	17	15	13	11c ₱ ℔, dis 20&10 %

Double-Pointed Tacks.....dis 40&5 %

Tap Borers.

Common and Ring.....dis 25&10 %
Ives' Tap Borers.....dis 10&10 %
Enterprise Mfg. Co.....dis 20 %

Tapes, Measuring.

American Flask and Cap Co.....dis 20 %
Eddy's.....dis 20 %

Tea Trays.

American Tea Tray Co.....dis 15 %

Thermometers.

Tin Case.....dis 60&5&10 %

Tobacco Cutters.

Enterprise Mfg. Co. (Champion).....dis 20 %
Wood Bottom.....₱ doz $12.00, dis 30&10 %
All Iron.....₱ doz $10.50, dis 40&5 %
Nashua Lock Co.'s.....₱ doz $18.00, dis 50 %

Toe Calks.

Winsted.....₱ ℔ 10c. dis 5 @ 7½ %

Tinners' Tools and Machines.

P. S. & W.....dis 10 %

Traps.

Game, Newhouse.....dis 30 %
" Newhouse Pattern.....dis 60 %
" Blake's Patent.....dis 40 %
Mouse, Wood, Choker.....₱ doz holes, 15 @ 16c
" Patent Choker (Union Nut Co).....₱ doz holes, 16 @ 18c, net
" Round Wire.....₱ doz $1.50 @ $2.00, net
" Square " .....₱ doz $2.00 to $2.50, net
" Cage " .....₱ doz $2.50, dis 10 %
" Patent Self Setting.....₱ doz holes, 25c, net
" Catch-em-alive.....₱ doz $4.00, net

Trowels.

Lothrops Brick and Plastering.....dis 10 %
Disston's Brick and Plastering.....dis 20 %
Peace's Plastering.....dis 20 %
Clement & Maynard's.....dis 20 %
Rose's Brick.....dis 5 %
Brades' Brick.....gold, dis 20 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 25 %

Triers.

Butter and Cheese.....dis 25 %

Ventilators, Window.

Nickel and Gilt.....₱ doz $16.00 @ $18.00

Vises.

Solid Box, Trenton.....40 to 160 lbs., 12½c, net
" Wilson's..... 30 to 150 lbs., 18c, / 160 and over, 22c, } dis 33⅓ %
" Peter Wrights.....15½c, gold
Parallel, Parker's.....dis 20 %
" Wilson's.....dis 30&10 %
" Sargent's.....dis 55&10 %
" Trenton.....dis 25 %
" Backus and Union.....dis 25 %
" Merrill's.....dis 15 %
" Fisher & Norris.....dis 15&10 %
" Buffalo.....dis 25 %
" Stevens'.....dis 25 %
" Simpson's Adjustable.....dis 25 %
Saw Filers, Bonney's.....₱ doz $20.00, dis 25 %
" Stearn's.....₱ doz $20.00, dis 25 %
" Hopkins'.....₱ doz $17.50, dis 10 %

Wheel Barrows.

Canal (Pugsley & Chapman.....new list, dis 30 %
Coal, Garden and Stone (Pugsley & Chapman)..dis 30 %
Jacob's Pat. Self-Oiling R. R. and Canal.....dis 25 %

Well Wheels.—Revised list.....dis 60&10 %

Wire.

Brass and Copper.....List of Jan. 1, 1877, dis 10 %
Bright and Annealed.....Nos. 0 @ 18, dis 55 @ 57½ %
" " .....Nos. 19 @ 26, dis 60 @ 62½ %
" " .....Nos. 27 @ 36, dis 60 @ 62½ %
Coppered.....Nos. 0 @ 18, dis 47½ @ 50 %
Galvanized, Nos. 0 to 6.....₱ ℔ 8c, net
" Nos. 7 to 13.....market list, dis 25 %
Tinned, Nos. 0 to 18.....dis 32½ @ 35 %
Cast Steel.....dis 20 @ 25 %
Tinned Broom Wire, Nos. 18 to 25.....dis 42½ @ 45 %
Galvanized Telegraph, Nos. 8 and 9.....₱ ℔ 9c
" " Nos. 10 and 11.....₱ ℔ 10c
" " No. 12.....₱ ℔ 10½c
Annealed Fence, Nos. 8 and 9.....dis 55 %
" Grape, Nos. 10 to 14.....dis 55 %
Fence Staples.....₱ ℔ 7 @ 7½c
Fence Staples, Galvanized.....₱ ℔ 10c
Stubs Steel Wire.....$7.00 to £ gold
Japanned Barb Fence.....₱ ℔ 15c
Galvanized " .....₱ ℔ 18c
Steel Music Wire, Nos. 12 to 27.....₱ ℔ 10c
Judd's Picture Wire.....dis 50 %
Clothes Line Wire, Galvanized.....₱ coil 43 @ 52c, net

Wrenches.

American Adjustable.....dis 45 %
Baxter's Adjustable "S," New list May 1, '76....dis 20 %
" Diagonal, " " ....dis 20 %
Collins & Co.'s.....dis 45 %

Coes' Genuine.....dis 50&5 %
" Pattern (Wrought).....dis 50&10 %
" " (Malleable).....dis 75&10 %
Girard.....dis 50&10 %
Hull & Belden's "Climax".....dis 25 %
Knight's Patent.....dis 25 %
Lindsay's " .....dis 25 %
Taft's Pattern.....dis 75&10 %
Davis' Patent Duplex.....new list, dis 25 %
Bemis & Call's Patent Combination.....dis 20&5 %
" " Merrick's Pattern.....dis 25&2½ %
" " Briggs' Patent.....dis 20&5 %
Aiken Pocket (Bright).....$8.00, dis 40 %

Wringers. Per doz.

Universal, without Cog Wheels.....$54.00
" with Cog Wh'ls, No. 2½, small fam'y size 63.00
" " " No. 2, usual " .. 66.00
Crown No. 2.....57.00
" No. 3.....69.00
Climax No. 2.....$71.00 } Less $2.00 ₱ doz. for cash before shipment.
" No. 1½..... 79.00
XXX Universal No. 2..... 71.00
" No. 1½..... 79.00
Household, no Cog Wheels.....54.00
Sherman, with " 63.00
Eureka, no " 60.00
Reliance, with " 63.00
Novelty, No. 10, with Cog Wheels.....63.00
" No. 2, " " 60.00
" No. E, for Set Tubs.....72.00
Keystone No. 1, Wood Frame, no Gear.....57.00
" No. 2, Iron " 54.00
" No. 2½, Wood " Purchase Gear.....64.00
" No. 3, Iron " " 61.00
" No. 10, Wood " Common Gear.....67.00
Peerless, No. 2.....66.00
" No. 3.....74.00

Stamped Tinware.

Common Stamped Ware.....dis 20 %
Stamped Deep and Retinned Ware.....dis 33⅓ %
Japanned Tinware.....dis 5 %
Planished " .....dis 20 %

METALS.

IRON.—DUTY: Bars, 1 to 1½c. ₱ ℔; Sheet, Band Hoop and Scroll, 1¼ to 1¾c. ₱ ℔; provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 ₱ ton; Polished Sheet, 3c. ₱ ℔; Wrought Scrap, $8 ₱ ton; Cast Scrap, $6 per ton. Railroad, 70c. ₱ 100 ℔s. Boiler and Plate, 1½c. ₱ ℔.

Pig Iron—AMERICAN.

Foundry No. 1.....₱ ton $18.00 @ 19.00
" No. 2.....₱ ton 17.00 @ 18.00
Gray Forge.....₱ ton 16.00 @ 17.00

SCOTCH.

Glengarnock.....₱ ton 25.00 @ 25.50
Eglinton.....₱ ton 24.00 @ 24.50
Coltness.....₱ ton 26.50 @ 27.00

Bar Iron.

American Refined.....2c

Rails.

Iron, at mill.....₱ ton $33.00 @ 38.00
Steel, " .....₱ ton 45.00 @ 47.00
Old Rails.....₱ ton 19.00 @ —

Scrap.

Wrought Scrap, from yard.....₱ ton 23.00 @ 24.00

Bar Iron, from Store.

Common Iron:
¾ to 2 in. round and square..... } ₱ ℔ 1 90
1 to 6 in. x ¾ to 1 in.....
Refined Iron:
¾ to 2 in. round and square..... } ₱ ℔ 2.30
1 to 6 in. x ⅜ to 1 in.....
1 to 6 in. x ⅜ and 5-16..... ₱ ℔ 2.50
Rods—⅝ and 11-16 round and square..... ₱ ℔ 2.40
Bands—1 to 6 x 12 to 3-16..... ₱ ℔ 2.70
Swedish Iron:
Ordinary sizes.....$130.00 @ 132.50
Plow size.....

Sheet Iron.

	Common American.	R. G. American.
Nos. 10 to 20	₱ ℔ 3 c	4 @ 4¼c
" 21 to 24	₱ ℔ 3½c	4¼ @ 4½c
" 25 to 26	₱ ℔ 3½c	4¾c
" 27	₱ ℔ 3¾c	5 c
" 28	₱ ℔ 4 c	5½c

Galvanized, 14 to 20, prime, ₱ ℔ 7½c; 2d qual, ₱ ℔ 6 c
" 21 to 24, " ₱ ℔ 8 c; " ₱ ℔ 6½c
" 25 to 26, " ₱ ℔ 8½c; " ₱ ℔ 7 c
" 27 " ₱ ℔ 9 c; " ₱ ℔ 7½c
" 28 " ₱ ℔ 9½c; " ₱ ℔ 8 c
Patent Planished..... ₱ ℔ A, 11c; B, 9½c
Russia, Nos. 8 to 26.....₱ ℔ 11½ @ 12c
American Cold Rolled.....₱ ℔ 4½c

COPPER.—DUTY: Pig, Bar and Ingot, 5c; Old Copper, 4c ₱ ℔; Manufactured (including all articles of which Copper is a component of chief value), 45 % ad valorem.

American Ingot.....₱ ℔ 19 @ 19¼c
English " .....₱ ℔

SHEATHING, BRAZIERS' COPPER, BOLTS, &c.

Braziers' Copper, ordinary sizes, over 16 oz., ₱ sq. ft.....₱ ℔ 30c
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., ₱ sq. ft.....₱ ℔ 32c
Braziers' Copper, 12 oz., ₱ sq. ft.....₱ ℔ 34c
Circles less than 24 in. in diameter.....₱ ℔ 33c
Circles 24 in. diameter and over.....₱ ℔ 36c
Segment and Pattern Sheets.....₱ ℔ 33c
Locomotive Fire Box Sheets.....₱ ℔ 30c
Sheathing Copper, over 12 oz. ₱ sq. ft.....₱ ℔ 26c
Bolt Copper.....₱ ℔ 30c
Copper Bottoms.....₱ ℔ 30c net

No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the sq. ft.

TINNING.

14x48, by the case.....₱ sheet 6c
14x48, less than case.....₱ sheet 8c
For tinning both sides, double the above amount.

O'NEILL'S PATENT PLANISHED COPPER.

14x48.

14 and 16 oz. and heavier..₱ ℔ 36c By the case. ₱ ℔ 35c
12 oz. and lighter.....₱ ℔ 39c " " ..₱ ℔ 38c

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60.
14 and 16 oz. and heavier. ₱ ℔ 38c By the case. ₱ ℔ 35c
(And all sizes not over 20 in. wide.)
30x60.
14 and 16 oz. and heavier.....₱ ℔ 40c
12 oz.....₱ ℔ 43c

Brass.

Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.
January 1, 1877.

Cash prices for Roll and Sheet Brass. For less quantity than 100 ℔s. add 3c ₱ ℔.

HIGH BRASS.

All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in.....30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive.....34c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive.....37c
½c. ₱ ℔ advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass. at....50c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in.37c
Printers' Rules.....44c
Sheets wider than 30 in. and under 40 in.....45c
" " 40 in. and over.....47c
Circular Sheets, in diam. from 4 in. to 14, inclusive..41c
" " over 14 " 20, " ..45c
" " " 20 " 30, " ..48c
" " " 30 " 40, " ..51c
" " " 40 in.....54c

LOW BRASS.

4c ₱ ℔ more than High Brass,
Gilding Metal, 8c ₱ ℔ more than High Brass.

Platers' or Gold Metal { In Bars.....46c / Sawed.....49c / Planed or Polished.....52c

FOR SLITTING.

Metal in width 2 in. to ⅛ in. to No. 28, inclusive, 1c. ₱ ℔ advance.
Metal, in width 2 in to 1 in., thinner than No. 28, 2c. ₱ ℔ advance.
Metal, in width 1 in. to ⅛ thinner than No. 28, 3c ₱ ℔ advance.
Metal, in width ⅛ in. to ¼, inclusive, not thinner than No. 28, 2c. ₱ ℔ advance.
Metal, in width ⅛ in. to ¼ thinner than No. 28, 3c. ₱ ℔ advance.
Metal, ¼ in. in width and less, 10c. ₱ ℔ advance.
Any of the above widths cut to particular lengths, add 7c. ₱ ℔.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire.
per cent., 12 n., to No. 26	$0.60	$0.85
6 " " "	.68	.95
10 " " "	.84	1.15
15 " " "	1.04	1.40
18 " " "	1.16	1.55

German Silver Sheets over 12 in. wide and weighing more than 16 ℔s., $2.25 ₱ ℔.
Advance 2c. for each additional inch in width above 12 in., and 2c. ₱ ℔ on each No. thinner than Nos. 26 to 36, inclusive.
All German Silver thinner than No. 36 is Platers, at 50c ₱ ℔ additional.
All German Silver Scrap one-third less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No. 0 to 20	$0.34	$0.38	$0.45
No. 21	.35	.39	.46
No. 22	.36	.40	.47
No. 23	.37	.41	.48
No. 24	.39	.43	.50
No. 25	.42	.46	.53
No. 26	.44	.48	.55
No. 27	.46	.50	.57
No. 28	.49	.53	.60
No. 29	.52	.56	.63
No. 30	.55	.59	.69
No. 31	.59	.64	.75
No. 32	.63	.67	.81
No. 33	.67	.71	.90
No. 34	.71	.75	1.00

Spring Wire 2c ₱ ℔ advance.
Flat, Square and Half Round Wire 50 ₱ ℔ advance on Round Wire.
Fancy Wire not less than 100 ₱ ℔ advance of Round Wire.

Brass Rods, No. 8 and smaller not less than 2 feet lengths, 45c.
Wire straightened and cut, smaller than No. 8, and not less than 2 feet lengths, 40c.
Wire and Rods less than 2 feet lengths, special rates.
Twelve cents per ℔ extra for spooling on 1 ℔ spools.

MISCELLANEOUS.

Common Plain Brass Pail Ears.....$0.44
Brass Door Rail.....45

SCRAP.

High Brass Scrap.....16c
Low " " 18c
Gilding.....20c
Turnings, Filings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING. ₱ ℔

Plain to No. 20 inclusive, above ¼ in. to 3 in.....$0.40
" above 3 in.....50
Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.
Plain, ¼ inch.....78
" 3-16 " 1.10
" ⅛ " 1.60
All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing to No. 20.....53
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ½ cent for each additional cutting under 2 feet.
All Mandrel Drawn Tubes under ⅜ in., 25 cents per pound advance.

ZINC TUBING.

Plain.....28
Fancy.....31
Scotch and Extra Patterns.....34

GERMAN SILVER TUBING.

4 Per cent.....85
6 " 95
9 " 1.10
12 " 1.25
15 " 1.40
16 " 1.45
18 " 1.55
20 " 1.50

STEEL.—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents ₱ ℔, or under, 2¼ cents; over 7 cents, and not above 11, 3 cents ₱ ℔; over 11, 3½ cents ₱ ℔, and 10 % ad val. Railway Bars, 1¼ cents ₱ ℔. Railway Bars, in part Steel, 1 cent ₱ ℔. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

Tool.....15 @ 16c
Spring.....10c
Homogeneous.....12½c
Tire.....12½ @ 13½c
Machinery (round and square).....10 @ 11c
File.....11c
Sheet.....14 @ 16c
Saw Plate, mill and mulay.....14 @ 16½c
" gang and X cut.....13 @ 14c
" circular as to size.....18 @ 30c

Chrome Steel.

Tool.....₱ ℔ 18 @ 19c
Tool, extra fine.....₱ ℔ 40 @ 75c
Spring.....₱ ℔ 10 @ 11c
Machinery.....₱ ℔ 10 @ 11c
Hammer.....₱ ℔ 12 @ 13c
Gun or Homogeneous.....₱ ℔ 14 @ 16c

English Steel.—Payable in gold, net.

Best Cast.....₱ ℔ 17¾c
Extra Cast.....₱ ℔ 18¾c
Round Machinery, Cast.....₱ ℔ 10¼ @ 11¼c
Swaged, Cast.....₱ ℔ 10½c
Best Double Shear.....₱ ℔ 17¾c
Blister, 1st quality.....₱ ℔ 14¼c
" 2d quality.....₱ ℔ 13c
German Steel, Best.....₱ ℔ 11¼c
" 2d quality.....₱ ℔ 10¼c
" 3d quality.....₱ ℔ 9½c
Sheet Cast Steel, 1st quality.....₱ ℔ 17¾c
" " 2d quality.....₱ ℔ 14¼c
" " 3d quality.....₱ ℔ 12½c
File Steel, Flat and ½ Round.....₱ ℔ 12½c
" Square and Round.....₱ ℔ 12½c
" Mill.....₱ ℔ 13¼c
" Taper to 4 inch.....₱ ℔ 16c
" Taper 3 and 3½ inch.....₱ ℔ 18c

ANTIMONY.....13c currency
LEAD.—DUTY: Pig $2 ₱ 100 ℔s; old Lead, 1½c ₱ ℔; Pipe and Sheet, 2¾c ₱ ℔.
Spanish.....6¾ @ 6¾c gold
German Refined.....6¾c gold
English.....6¾ @ 7c gold
American.....5¾ @ 6c currency
Bar.....7c, dis 10 %
Pipe.....9c, dis 10 %
Tin Lined Pipe.....16½c, dis 10 %
Sheet.....9½c, dis 10 %
Shot.....Drop 9¼; Buck, 10¼c, dis 10 %

BABBITT METAL.

N. P. N.....₱ ℔ 8½ @ 9c
A, 25c; B, 20c; C, 15c; D, 12c ₱ ℔.
TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1.1c ₱ ℔; Electro-galvanized Plates, 2c ₱ ℔; Manufactures of, not enumerated, 35 per cent. ad. val. Bars, Block and Pigs free. Banca, subject to duty of 10 per cent.
Banca.....₱ ℔ 19 @ 19½ currency
Straits.....₱ ℔ 17 @ 17½ currency
English.....₱ ℔ 17½ currency

TIN PLATES, CURRENCY PRICES

I C 10x14 / 12x12 / 14x20 } Prime Charcoal.....$7.50
I X 10x14 / 12x12 / 40x20 } Prime Charcoal.....$9.75
D C 12½x17 " 7.00
D X 12½x17 " 9.25
For each additional X add.....2.25

COKE TIN PLATE.

	Best.	2d quality.	Ordinary.
I C 10x14 / I C 12x12 / I C 14x20	$7.00	6.75	6.25 @ 6.50

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$6.75 @	6.50	6.25 @ 6.00
I X 14x20	9.00 @ 8.75	....	....
I C 20x28	13.50 @ 14.00	13.00 @ 13.50	12.00 @ 13.00
I X 20x28	.... @ 19.50	....	....
I C 20x20	.... @ 21.00	....	....

I C 14x20 M. F. Brand.....$7.75 @ 8.00
SOLDER.....No. 1, 11½ @ 12½c; No. 2, 10¾ @ 11¼c
SPELTER—DUTY: in Pigs, Bars and Plates, $1 ₱ 100 ℔s.
Silesian, cash.....6¾ @ 7c gold
American, cash.....6¼ @ 6½c
Lehigh, on spot.....10c
ZINC.—DUTY: Pig or Block, $1.50 ₱ 100 ℔s. Sheet, 2½c ₱ ℔.
Sheet.....cask 7¼c
" .....7¾ @ 8c

Paper Stock, Old Metals, &c

(Dealer's Selling Price.)

Canvas linen.....5¾ @
" cotton, No. 1..... @ 6¼
" " No. 2..... @ 3½
White linen rags, No. 1.....5½ @
" " No. 2.....3½ @
Colored.....2¾ @
Mixed woolens.....2½ @ 3¼
Soft woolens.....2 @
Gunny bagging.....3¾ @
Jute Butts.....3 @ 3¼
Kentucky bagging.....5 @
Waste paper and scraps.....1 @ 1¼
Rope cuttings.....1¼ @ 3
Kentucky bale rope.....4 @ 4½
Oakum junk, No. 1.....5½ @ 5¾
" No. 2..... @ 4
Grass rope.....3¾ @
Tarred shaking.....2 @
White collar cuttings, all paper.....7 @
" " " muslin lined.....5 @
" " Envelope.....7 @
Hard White Shavings, No. 1.....5½ @
Soft " " No. 1.....4½ @ 4¾
White Shavings, No. 2.....4¼ @ 4¾
Mixed Shavings, part white.....3½ @ 4
Imperfections, No. 2, best folded sheets.....4¾ @
" No. 1, Heavy Stock.....4¼ @
Book Stock.....3½ @ 3¾
" " Mixed.....4½ @
" " No. 2, light.....2 @
Newspaper Stock.....2¾ @
Prints.....1½ @ 2
Pure Manilas.....2¾ @ 2½
Bogus Manilas and Hardwares.....1 @
Commons.....¾ @
Binders' Board Cuttings.....1 @
Straw Board Cuttings.....¾ @
Woolen Tailor Clips.....13 @ 14
Satinet " .....2 @ 2½

Old Metal.

Copper.....16½ @ 17
Yellow Metal.....13 @
Brass, light.....9½ @
" heavy.....11 @
Heavy Composition.....14 @
Old Lead, solid..... @ 4½
Tea Lead..... @ 4¾
Zinc..... @ 4¾
Pewter, No. 1.....15 @
" No. 2.....9 @ 10
Spelter..... @ 6¾
Wrought Iron.....per ton $20.00
Machinery Iron.....per ton 13.00
Light Iron.....per ton 13.00
Stove Plate.....per ton 10.50
Burnt Iron.....per ton 5.00

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters.....₱ ℔ 20c
" " Ordinary.....6c
" Ivory Drop, fair.....15c
" " best.....23c
Black Paint, in oil.....kegs, 8c asst'd cans, 11c
Blue, Prussian, fair to best.....40 @ 55c
" " " in oil.....25 @ 55c
" Chinese dry.....8c
" Ultramarine.....18 @ 30c
Brown, Spanish.....15c
" Van Dyke.....9c
Carmine, 40.....combination price
Green, Chrome.....15 @ 24c
" " in oil.....18 @ 22c
" Paris.....good, 30c; best, 40c
" " in oil..... " " 45c
Mineral Paints.....1¼ @ 4c
Orange Mineral.....15c
Red Lead, American.....9c
" " English.....10c
" Venetian (N. C.) dry.....3c
" " in oil.....asst'd cans, 11c; kegs, 8½c
" Indian dry.....9c
Rose Pink.....10 @ 13c
Sienna, American, Raw.....4c
" Burnt.....4½c
" " in oil.....15 @ 20c
" Raw " .....15 @ 25c
Umber, Burnt.....4 @ 8c
" " in oil.....10 @ 21c
" Raw.....3½ @ 7½c
" " in oil.....10 @ 20c
Vermillion, Chinese.....$1.00, gold
" English.....72½c, gold
" Trieste.....1.10, gold
" American, Common.....12c
White Lead, American, pure dry.....9½c
" " " in oil.....11c
White, Paris, English, prime.....in bbls. 2½ @ 2¾c
Yellow Ochre, French.....$1.75
" " In oil...asst'd cans, 11c; kegs, 7c
" " Vermont.....in casks 1½c
Yellow Chrome.....17 @ 27c
" " in oil.....18 @ 28c
Zinc White, American No. 1, dry.....9c
" " No. 1, in oil.....11c
" French (Paris).....11c
" " in oil.....11c

Oils.

Linseed, Raw.....₱ gal. casks, 59c. bbl, 61c
" Boiled.....casks, 70c. bbl, 71c
Whale, Crude.....bbl, —
" Bleached Winter.....bbl, 75c
Sperm, Crude.....bbl, 1.60
" Winter unbleached.....bbl, 1.65
" " bleached.....bbl, 1.75
Seal, Extra Refined.....bbl, —
Lard, Pure Winter.....bbl, 80c
" Spring.....bbl, 80c
Cotton Seed, Crude.....bbl, 62c
" Southern Yellow.....bbl, 67c
" White.....bbl, —
Neatsfoot, Winter.....75c @ $1.10
Natural Lubricating.....32c @ 50c

Sundries.

Asphaltum.....6c
Benzine.....₱ gal. 16c
Chalk.....3½c
" Block.....4½c
Dryer, Patent, Am'n.....asst'd cans, 11½c; keg, 9c
" " English..... " 11c; " 9c
Flocks.....
Frosting.....8c
Glue, White.....33 @ 44c
" Sheet.....20c
Glaziers' Points, Zinc.....6c
Gum, Copal.....36c
" Damar.....25c
" Shellac, English.....45c
" " dark.....30c
Litharge.....6½c
Pumice Stone, selected Lumps.....4 @ 6c
" powdered.....3½c
Putty, in bladders.....2½c
" in bulk.....2½c
Rotten Stone, soft, English.....8c
Spirits Turpentine.....36c
Whiting, Spanish.....¾c

Glass.

FRENCH WINDOW GLASS.

Prices current per box of 50 feet.

Single Thick.—Discount 60 %

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 11 x 15	$ 7.00	$ 6.75	$ 6.25	$ 5.75
11 x 14 to 16 x 24	8.75	7.75	7.25	6.50
15 x 22 to 20 x 30	10.75	9.75	8.75	7.75
16 x 24 to 24 x 30	12.50	10.75	9.00	
20 x 28 to 24 x 36	13.00	12.00	10.75	
26 x 32 to 26 x 44	14.50	13.25	12.75	
30 x 36 to 30 x 52	17.00	14.00	11.25	
30 x 54 to 30 x 58	19.00	14.50	13.00	
30 x 60 to 34 x 56	17.25	16.50	13.50	
34 x 58 to 34 x 66	19.25	17.25	15.00	
30 x 62 to 40 x 66	20.75	18.75	17.25	

Double Thick.—Discount 60 & 10 %

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 16 x 15	$12.00	$11.00	$10.00	$ 9.25
11 x 14 to 16 x 24	13.75	12.50	11.75	10.50
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 56	24.00	22.50	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 56 to 34 x 54	27.75	25.00	21.75	
34 x 58 to 34 x 66	29.25	27.75	24.00	
36 x 60 to 40 x 66	33.25	30.00	27.75	

Sizes above 40 x 66—$10.00 per box extra for every five inches.

An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket.

PRATT & CO.,

BUFFALO, N. Y.

MANUFACTURERS AND DEALERS IN

Hardware, Iron & Nails,

Bolts, Nuts, Washers, Screws, &c.

TRADE SPECIALTIES.

Globe Horse Nails, Putnam Horse Nails, National Horse Nails, Buffalo Forged Horse Nails.

Burden Horse Shoes, Walker Horse Shoes, Providence Horse Shoes.

TOE CALKS, CAST STEEL, BELLOWS, ANVILS AND VISES.

FRANCIS' AXES, full Assortment.

Special Brands.—"KING OF THE FOREST," "ROYAL WOOD CHOPPER."

Tubular Lanterns, Fletcher Post Auger, Coil and Log Chains.

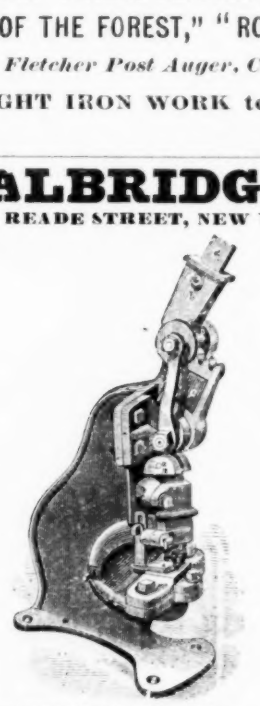
WROUGHT IRON WORK to order.

Orders promptly attended.

G. B. WALBRIDGE & CO.,

No. 83 READE STREET, NEW YORK.

Shears for Rd. and Square ¼ to 1¼ in.



Punch ⅛ to ¼ in., ½ in. Plates.

Shears for Plates and Bars.

Successors to the

BIDDLE M. & T. CO.

Sole Manufacturers of

Lyon's Patent Hand and Power

DRILLS, SHEARS AND PUNCHING PRESSES

For Workers in Iron and Steel, adapted for all trades.

Send for Circular. AGENTS WANTED.

ESTABLISHED 1836.

STOV

Steel.

SULZBACHER, HYMAN, WOLFF & CO.,

IMPORTERS OF

IRON AND STEEL.

Sole Agents for the Sale of the Celebrated

Pr. HOMOGENEOUS DEC.' CAST STEEL, GUN BARRELS, MOULDS AND ORDNANCE.

Sole Agents for **COCKER BROTHERS,** Limited.

Successors to

SAML. COCKER & SON, (ESTABLISHED 1752.)

SHEFFIELD, ENGLAND.

Sole manufacturers of

"SC" **EXTRA" Cast Steel,**

AND

CAST STEEL WIRE FOR ALL PURPOSES.

Sole makers of **COCKER'S "METEOR" WIRE PLATES.**

Railroad Supplies and General Merchants.

Office and Warehouse, 46 Cliff Street, New York.

F. W. MOSS,

Successor to JOSHUA MOSS & GAMBLE BROS.

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STEEL AND FILES.

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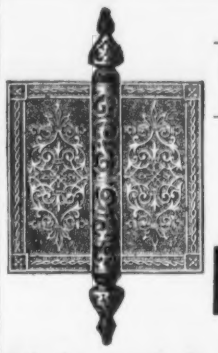

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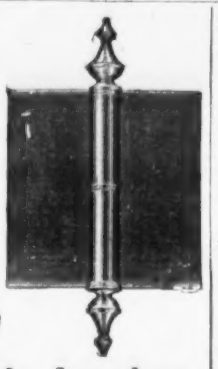

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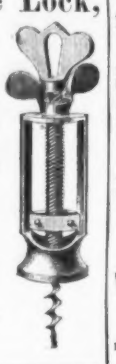

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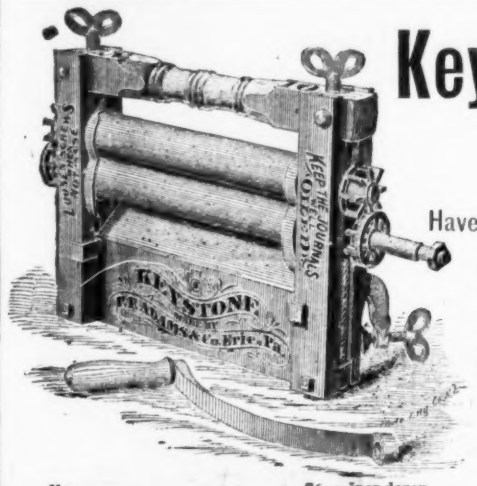

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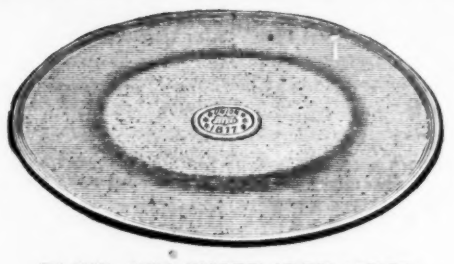

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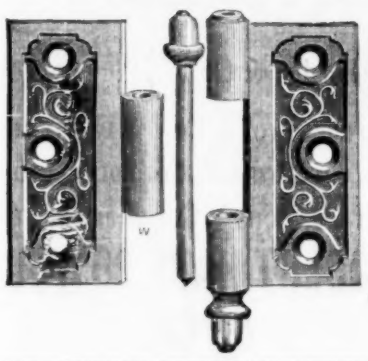

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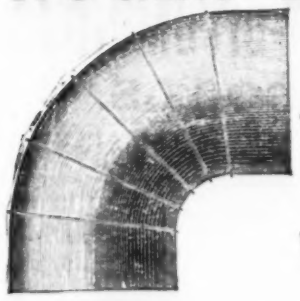

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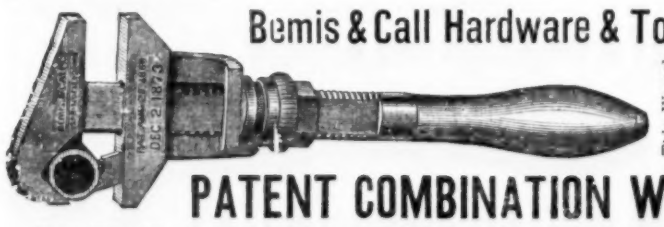

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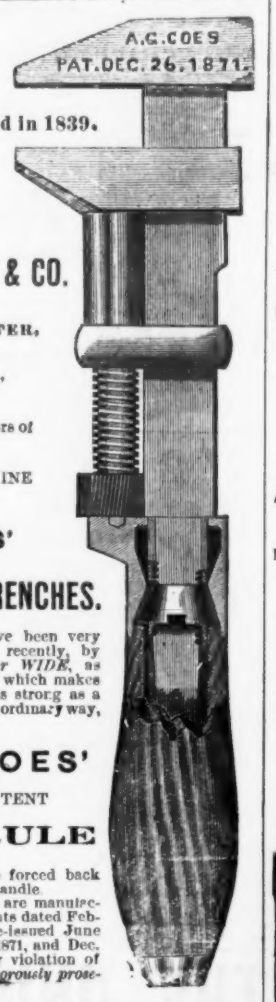

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COES'

SCREW WRENCHES.

Our goods have been very much improved recently, by making the *Bar WIDE*, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES'

NEW PATENT

FERRULE

Which cannot be forced back into the handle.

☞ Our goods are manufactured under Patents dated February 7, 1860, (re-issued June 29, 1871), May 2, 1871, and Dec. 26, 1871, and any violation of either will be *vigorously prosecuted.*

We call particular attention to our new Patent Ferrule, with its supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES & CO.

Our Agents, GRAHAM & HAINES, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

Smith's Patent Improved.

THE BEST ADJUSTABLE HOLLOW AUGER MADE.

E. M. BIRDSALL & Co., Pen Yan, N. Y., write: "The Tenon Auger, which you sent us on approval, we have fully and severely tested. It is the best tool for the purpose which we have seen or used."

CHAS. M. GHRISKEY,

Manufacturers' Agent,

508 Commerce Street, Philadelphia, Pa.

FAC-SIMILES

OF THE

Centennial Award Medal

Executed on Glass "en Relief," for outside show, from 8 to 24 in. diameter, by the

Otto Stietz N. Y. Glass Letter Co., 611 Broadway.

Advertising Glass Signs a specialty.

COBB & DREW,

Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets; Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk Clout and Cigar Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY

George C. Grundy,

HARDWARE.

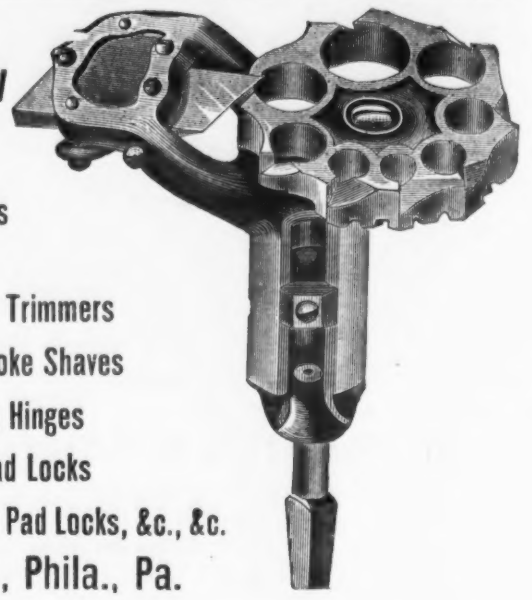
165 Greenwich Street,

Agent for the Philadelphia Star Carriage and Tire Bolts

Lloyd, Supplee & Walton,

HARDWARE FACTORS.

MANUFACTURERS OF



Bonney's Hollow AUGERS.

Stearn's Hollow Augers and Saw Vises

Bonney's Spoke Trimmers

Double Edge Spoke Shaves

Adjustable Gate Hinges

Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.

"FELTER'S PATENT LOCKS,"

MANUFACTURED BY

The American Lock Mfg. Co.,

Are the most SECURE and DURABLE ever made.

SECURE

Because they have 40 Brass Tumblers, independent in their action, either one of which will prevent the Lock from being opened unless brought to proper position by the Key.

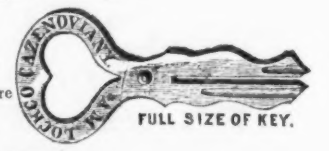
DURABLE

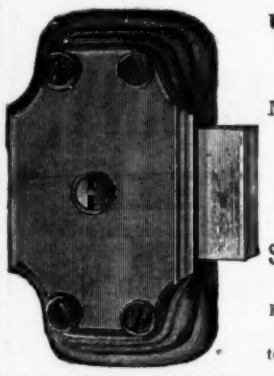
Because we use no Springs to break or get out of place.

THEY HAVE

STERLING METAL KEYS

That will not corrode or wear, and are stronger than steel.





Upright Rim Dead Locks,

Horizontal Rim Night Latches,

Horizontal Rim Tubular Night Latches,

Mortise Night Latches, Plain Fronts,

Mortise Night Latches, Ornamental Bronze Fronts and Knobs,

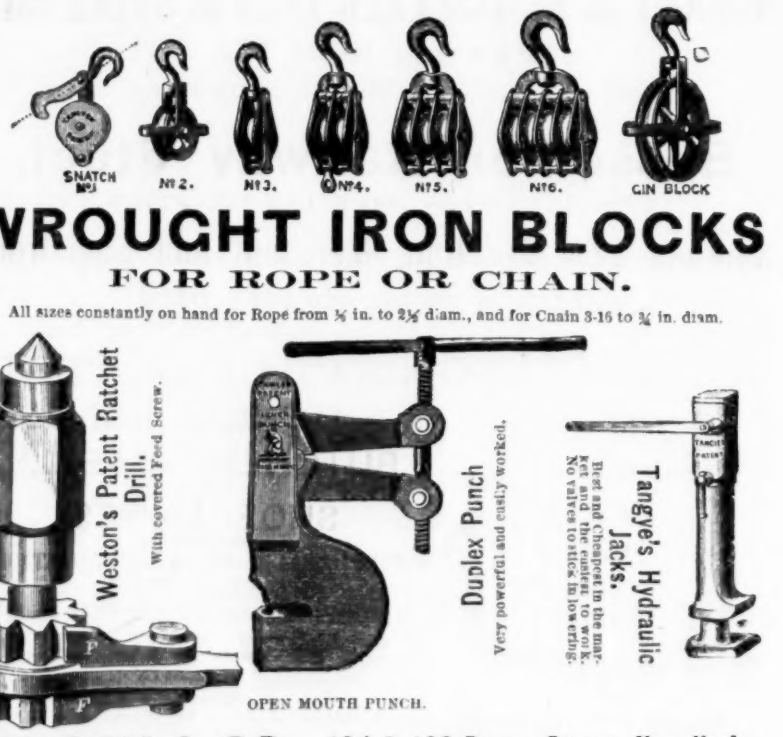
Brass Chest, Box, Cupboard and Drawer Locks,

Solid Bronze Padlocks.

Illustrated Catalogue and Price List sent on application.

All orders should be addressed to

UNION NUT CO., General Agents, 99 Chambers St., N. Y.



WROUGHT IRON BLOCKS

FOR ROPE OR CHAIN.

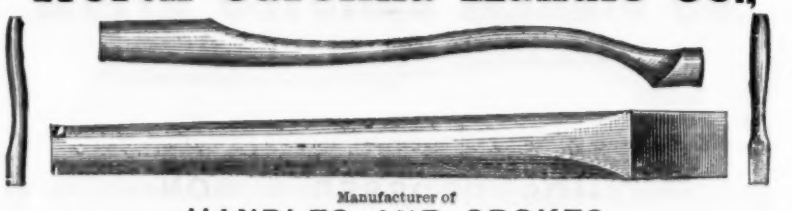
All sizes constantly on hand for Rope from ¼ in. to 2½ diam., and for Chain 3-16 to ¾ in. diam.

McCOY & CO., 134 & 136 Duane Street, New York.

V. G. HUNDLEY.

Proprietor of

North Carolina Handle Co.,



Manufacturer of

HANDLES AND SPOKES.

Handles for export a specialty. *79 Reade and 97 Chambers Street New York*

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.
Peter Wright's, ₩ ℔, gold....11 @ 10½c
Wilkinson's " " ....11 c
Eagle....9 cents per lb—dis 40%

Apple Parers.—Domestic....per doz $ 6 50
Peach Parers.... " 10 50
Bay State Parer, Corer and Slicer.... " 12 50
Other makes.... " 7 50
Lots of 5 to 25 dozen special price.

Axes.—
Mann's (according to weight)..Per doz. $10 00 @ 9 00
Red Indian. " " " " 10 50 @ 9 50
Red Chieftain " " " " 11 00 @ 10 00
Hunt's " " " " 12 50 @ 11 50

Augers and Auger Bits.—
Benjamin Pierce....dis 35 @ 40 %
Douglass' & Ives' Bits....dis 45 %
Connecticut Valley Auger Bits....dis 50 %
Cook's Bits....dis 50 @ 50&5 %
Jennings' Bits....dis 10 %
Bates' Nut Augers....dis 40 @ 40&10 %
Douglass' & Ives' Augers....dis 45 %
Watrous' Ship Augers....dis 20 %
Bonney's Pat. Hollow Augers....dis 25&10 %
Stearns' Patent Hollow Augers....dis 25&10 %

Balances.—
Light or "Common"....dis 25&10 %
All other Spring Balances....dis 25 %

Bells.—Bevin Bros. Mfg Co. Light Hand Bells...dis 70 %
Hand, Common....70&10 @ 75 %
Swiss Pattern Hand Bells....dis 50 %
Connell's Door Bells....dis 50&10 %
Gt. Western & Kentucky Cow, new list....dis 40 %

Boring Machines.—Bates Mfg. Co., complete with augers....dis 25 @ 25&10 %
Douglas Mfg. Co., complete with augers....dis 40 %
Common Boring Machines, no Augers....$3 15 net
Angular " " ....4 00 net

Bolts.—Eastern Carriage Bolts....dis 75 @ 75&5 %
Western " " ....dis 75 %
Philadelphia " " ....dis 60&10 @ 60&20 %
Coleman " " ....dis 60&10 @ 60&20 %
Wrought Shutter, Stanley....dis 50 @ 50&10 %

Braces.—Barber's....dis 40&5 %
Packus....dis 50 @ 50&10 %
Bartholomew's American Ball....dis 20&10 %
Sponard....dis 50 %

Butts.—Cast Fast Joint, Narrow....dis 30, 12½&10 %
" " Broad....dis 40, 12½&10 %
Cast Loose Joint....dis 50, 12½&10 %
" Acorn, Loose Pin....dis 45, 12½&10 %
" Acorn " Jap'd....dis 55, 12½&10 %
" Mayers and Parliament....dis 40, 12½&10 %
Lull & Porter's (Phila.) Hinges....dis 65 @ 65&10 %
Wrought Loose Pin....dis 40&5 %
" Table Hinges and Back Flaps....dis 35&5 %
" Narrow....dis 40&5 %
" Loose Joint....dis 45&5 %

Blind Butts.
Parker....dis 70 @ 70&10 %
Buffalo Hardware Co....dis 60 @ 60&10 %
Clark....dis 60 @ 60&10 %
Shepard....dis 60 @ 60&10 %
Garretson....dis 60 @ 6 &10 %

Chains.—German Hatter and Coil....dis 25 % gold
Galvanized Pump....net 10½c
Best Proof Coil Chain—

₩ ℔.....	12	9	8¼	8	7⅞	7¾	7c gold
	3-16	¼	5-16	⅜	7-16	½	⅝ in.

By the cask, 560 lbs., 3½c per lb. less Common Chain. ¼c per lb. less.

Chisels.—Socket Framing....dis 60, 10&10 %
Socket Firmer....dis 60 @ 60&10 %
" Tang....dis 40 %
Beaty's Framing and Firmer....dis 20 %

Counters.—Iron Bed....dis 40&10 @ 50 %
Porcelain Wheel Bed....dis 10&10 @ 50 %
Iron and Brass Wheel Plate....dis 50 @ 5&10 %
Porcelain Wheel " ....dis 50 @ 50&10 %

Coffee Mills.—Common Box and Side....dis 25 %
Patent Box and Side....dis 25 %

Cutlery.—American Pocket (best)....dis 30 @ 33⅓ %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices

Drawing Knives.—
Hart Mfg. Co.'s....dis 60&10 @ 60, 10&10 %
Adjustable Handle....dis 10 @ 15 %
Beatty....dis 15 @ 20 %

Fry Pans.

Tinned								
₩ doz..	$3 50	4 00	4 50	5 00	5 50	6 50	7 50	9 00 10 00
No....	0	1	2	3	4	5	6	7 8
Burnished								
₩ doz..	$3 00	3 75	4 25	4 75	5 25	6 00	7 00	8 00 9 00
No....	0	1	2	3	4	5	6	7 8

Tinned....dis 50 @ 50&10 %
Burnished....dis 50 @ 50&10 %

Files.
Nicholson Mill Files....new list, dis 25 @ 30 %
" Bastard.... " dis 25 @ 30 %
" Taper.... " dis 25 @ 30 %
Butcher's Mill....₩ ℔ gold $4 75 @ $4 50
" Bastard....₩ ℔ gold 4 75 @ 4 50
" Taper....₩ ℔ gold 4 75 @ 4 50

Fluting Machines.
Mrs Knox—6 in. rolls....each, $3 00 dis 10 %
Imperial—4½ in. roll....each $2 75 net @ dis 10 %
" —6 in. roll.... " 3 00 net @ dis 10%
Crown—4½ in. roll....each 2 50 net
" —6 in. roll.... " 3 00 net
" —8 in. roll.... " 25 net
Eagle—8½ in. roll....per doz. $18 00
" —5½ in. roll....per doz. 24 00

Hammers.
Yerkes & Plumb's....new list dis 25 %
Hammond & Son's....dis 25 %
Veree....dis 20 @ 25 %

Hatchets.

Beatty's					
	₩ doz..	$7 00	7 50	7 75	8 00
Shingling and Half.	No.....	1	2	3	
Yerkes & Plumb					
	₩ doz..	$7 00	7 50	8 00	8 50
Shingling and Half.	No.....	1	2	3	4
	₩ doz.	$7 50	8 00		
Claw....	No.	1	2		3

Hinges.
Strap and T....dis 60&5 %

Horse Nails.

	Nos.	5	6	7	8	9	10
Putnam		32	28	26	25	24	22
Ausable Pointed & Polished, list		28	26	25	24	23	
Clinton Horse Nails		20	18	17	16	15	
" Polished and Pointed		21	19	18	17	16	
Globe		28	26	25	24	23	

Discount on Ausable, Globe and Putnam....dis 10 %

Knobs.—
Rim and Mortise....dis 35 @ 35&2 %

Locks and Latches.
Door Locks, Rim and Mortise....dis 35 @ 37&2 %
Till and Cupboard Locks....dis 25 & 5 @ 25, 5&2 %
American Padlocks....dis 33⅓ @ 33⅓&2 %
Scandinavian Pad Locks.

₩ doz....	$10 50	10 50	12 00	12 00	15 00	15 00	50&10 @
No.....	59	59⅓	60	60⅓	61	61⅓	50&15 a
₩ doz....	$18 00		18 00		24 00	22 00	10 %
No.....	63		63½		63	63⅓	

United States Lock Co....dis 35 %
Trunk Locks....dis 25 %

Lanterns.—Square Candle and Oil....dis 10 %
Globe for Oil....dis 10 %
" Kerosene....dis 10 %
Tubular Lanterns....net

Mattocks.—Long and Short Cutter....dis 25 %
Western Pattern....dis 25 %
Pennsylvania Pattern....dis 15 %

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets....dis 20 %
Stebbins' Gates....dis 62½&10 %
Lincoln's " ....dis 40&10 %
Landers, Frary & Clark's Petroleum....dis 15&10 %
Taylor's Petroleum Faucets....dis 20&10 %
Brass Liquor Cocks....dis 45 @ 50 %

Meat Cutters.—Dixon's....dis 25 %
Woodruff....dis 25 %
Stowe....dis 25 %
Hale's....dis 35 %
Stuffers....dis 25 %

Planes.—Auburn Tool Co., " Bench....dis 40 %
Second Quality....dis 50 %
Bailey Iron Planes....dis 35&10 %
Evans Pat. Circular....net

Plane Irons.—American....dis 10 %
Butcher's....gold £, $5 00

Plumbs and Levels.
Adjustable....dis 60&10 %
Non-Adjustable....dis 60&10 %

Picks.—Philadelphia....net
Pittsburgh....net

Rules—Boxwood....dis 55&10 %
Ivory....dis 45&10 %

Rakes.—Cast Steel Garden....dis 40 @ 40&10 %
Malleable Garden....dis 40 @ 40&10 %
Wood Head Iron Teeth....dis 40 @ 40&10 %

Steelyards.—American Pattern....dis 20 @ 25 %

₩ doz....	$5 50	7 00	9 00	10 00	1	12 00
No.....	50	100	150	200	25	300

English Pattern....dis 15 @ 20 %

₩ doz....	$7 00	8 67	10 67	12 67	14 67	16 67
No.....	50	100	150	200	250	300

Hart's Pattern....dis 55 @ 55&10 %

₩ doz....	$14 50	17 75	21 00	26 50	31 00	35 50
No.....	50	100	150	200	250	300

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened....₩ doz. $9 50
Clipper No. 10, Bronzed Blade Boxed and Sharpened....₩ doz. $9 00
Clipper No. 8, Painted Red, Boxed and Sharpened....₩ doz $8 50
Cast Steel Scythes....$7 50 @ 8 00
German " ....6 50 @ 7 00

Sources.—Steel and Iron, new list....dis 50 %

Saws.—Disston's Cross Cut, No. 1....per ft., 55c
Disston's Cross Cut No. 2....per ft., 50c
Disston's Cross Cut, Patent....per ft., 50c
Disston's Circular Saws....dis 25 @ 30 %
Disston's Hand Panel and Rip, &c....dis 20 %
W McNiece's H'd, Cross-Cut & Circ'r, new list. dis 15 %
Boynton's Lightning Cross-Cut....dis 50 @ 50&10 %
Boynton One-Man Cross Cut Saws....dis 40&10 %

Shovels and Spades.
Rowland's Plain Back....dis 47½&2½ %
" Back Strap....dis 47½&2½ %
Extra discount on above for 10 days' cash, 5 %.
Oliver Ames & Sons, new list....dis 30 %
Sad Irons.—Richmond (polished face)....per lb. 8½c
Richmond (polished face)....by the cask " 8
Stone.—Arkansas Oil, No. 1....₩ ℔ $
Turkey Oil, No. 1.... " 25c
Wasnita Extra....net " 35c
" No. 1....net " 30c
" " 2....net " 25c
Hindostan 8 inch....₩ ℔ 4½ @ 4¾c., net
Screws.
United States and others in Combination....dis 60 %
Spoons.—
Plated....dis 40 @ 40&5 %
Britannia, Boardmans (new list)....dis 50&10 %
" Parkers (old list)....dis 50 @ 50&10 %
German Silver....dis 25&5 %
Lalance & Grosjean Iron....dis 30&10 %
" " " by case....dis 2&5 %
Springs.—Gray's Door....$2 15 @ $2 25
Torry's Door....2 15 @ 2 25
Gem....dis 10 %
Stocks and Dies.....dis 10&5 %
Stove Polish.—Gem....₩ gross, $4 25 @ 4 50
Onyx....$4 00 @ 4 25
Dixon....$5 75 @ 6 00
Try Squares.—Winterbottom....dis 20 @ 20&10 %
Stanley Rule and Level Co....dis 45&10 %
Willis Thrall, No. 2....dis 30&10 %
Disston's No. 2....dis 45 %
Tacks, &c.—Half Weight Tacks....dis 75 @ 75&10 %
Trunk, Clout and Finishing Nails....net to 10 %
Traps.
Genuine Oneida—Newhouse....list dis 25 @ 25&2 %
Im. Oneida—Newhouse list (1st qual.)....dis 40&45 %
Vises.—Solid Box, Trenton....₩ ℔ 12½c
Wrenches.—Coes Genuine....dis 50 %
Coes Pattern Wrought Bar....dis 50&10 %
" " Malleable Bar....dis 70&10 @ 75 %
Girard Wrenches, Coe's Pattern....dis 50&10 %
" Agricultural Wrench....$3 60 $5 40 net
Wrought Bar, Coe's Pattern....10 12 in
Tafts Pattern (Wrought Bar)....dis 70 @ 70&10 %
Philadelphia Tool Co.'s Pat. Duplex....dis 25 %
" " Improved Baxter....dis 25 %
Wire.—
No. 0 to 18....dis 52½ @ 55 %
No. 19 to 25....dis 57½ @ 60 %
No. 27 to 36....dis 60 @ 62½ %
Coppered 0 to 18....dis 47½ @ 50 %
Tinned Broom Wire....dis 35 %
Galvanized Wire No. 1 to 18....dis 25 %
Wringers.—Novelty No. 10....$63 00
Norte & No. 2....66 00
Universal....66 00

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
July 25, 1877.

Apple Parers—Bay State....per doz $12 00
Faultless Turn Table...." 7 50
Lightning...." 7 50
Peach Parers...." 12 00
Potatoe Parers...." 12 00
Climax Corer and Slicer...." 6 00
Bells, Cow—Law's Genuine....dis 50 %
Braces—Bit, Spofford's Patent....dis 50 %
Brads, Cut....dis 50&10 %
Brass—Sheets....list net
Boards—Stove, Brooks' Pat. dis 35 % 4 mos.; 35&5 % 30 dys
Bolts—Stove....dis 50 %
Brick—Bath (box of 2 doz) Best English....$1 12
Can Openers—Sprague's....dis 55&10 %
Cases—Parlor Coal Hod....dis 25 %
Chisels—Firmer Socket....dis 60, 10&10 %
Framing Socket....dis 60, 10&10 %
Corner Socket Chisels....dis 60, 10&10 %
Slick's Carpenters'....dis 60, 10&10 %
Castings—Malleable....dis 50 %
Cocks—Globe and Bibb....dis 45 %
Cutters—Meat, "Hales"....50%
Egg Beaters—" Dover"....per doz $4 00
" Family "....per doz $2 75
Elbows—Corrugated....dis 30 %
Adjustable....dis 30 %
Columbus....dis 30 %
Files—Maischoss Bros....dis 25 %
Fluters—Geneva Hand....dis 50&10 %
Freezers, Ice Cream—" Champion"....dis 33⅓&5 %
Hinges, Gate—Shepard's....dis 45 %
Hinges—Window Blind—
Shepard's and Standard....dis 60 %
Hoes, Coal—Plain, Black and Galvan'd...new list dis 25 %
Funnel, Black and Galvanized....dis 25 %
Fancy and Helmet....dis 25 %
Sad Irons....5c
Kettles—Brass....₩ ℔ 45c
Copper, "Hand Made"....38c
Enamelled....dis 60 %
Knives, Drawing—Oval No. 1....dis 60, 10&10 %
Razor Blade....dis 60&10 %
Lanterns, Tubular—with guard....$1 0 50
Without guard....10 00
Mills, Coffee—Box and Side, common....dis 35 %
Box Union and Eagle....dis 30 %
Cut Nails, "Cuesapeake," list....$2 60
Horse, Ausable....No. 5 6 7 8 9 10
30 27 25 24 23 22c
" " Pointed & Polished....add 1c ₩ ℔
" " 100 lbs....dis 5 %
Paint—White Lead, U. S. Gov't....₩ ℔ 9c
Pans—Dripping....₩ ℔ 9c
Frying....dis 50 %
Rivets—Iron, Black and Tinned....dis 40 %
Screws—"American Screw Co"—
Flat Head, Iron....dis 60&10 %
Flat Head, Brass....dis 55%
Sieves—Wood, Hoop Iron....$1 20
Tinned....1 5
Sifters—Ash....$9 00 @ $12 00
Skates and Straps—White's....dis 30 %
Spoons, Iron Tinned....dis 10 %
" by the case....dis 20 %
S. S. & Co., Kitchen....dis 20 %
Plated Rogers' A No. 1....₩ doz.... dis 55 %
Britannia....dis 55 %
G. S. Hall, Elton & Co....dis 25&5 %
Scales—Buffalo Scale Works....dis 25 %
Fairbanks....dis 15 %
Stove Polish—Gem....₩ gross, $4 50
" Dixon's....6 00
Palace....₩ gross, $3 00; bulk, per ₩ ℔....9c
Rising Sun....₩ gross, $5 75
Squeezers—Lemon, Porcelain....₩ doz.... 6 00 @ 9 40
Tacks—Half Weight Am. Iron....dis 35&10 %
Tea Trays....dis. 15 %
Thermometers—Tin Case....dis 50, 10&10 %
Tools—Tinmens'....dis 10 %
Vases—Palace Coal....dis 25 %
Vises—
Parallel, Buffalo....dis 30 %
Wire—Brass and Copper....list net
Wire—Bessemer Steel....dis 25 %
Wringers—Novelty....$66 00
Tin Plates.—Add for each X....2 50
10x14, IC, Charcoal....₩ 225 | 14x20 C. terne....$6 75
12x12, " ....7 25 | 20x28 C. " 14 00
12½x17, " ....6 75 | 20x28 X. " 19 00
14x20, " ....6 75 |
Pig Tin—Straits....20c @ 21c
Bar Tin....23c
Solder—S. S. & Co. No. 1....18c
S. S. & Co. Extra....15c
Sheet Zinc—
"Lasalle"....570 ₩ 100 ℔ casks
$7 50 7 80 ₩ 100 ℔s
Sheets....$7 50
Babbitt Metal....₩ ℔ 12c
Iron Wire—Bright and Annealed....dis 52½ %
Coppered....dis 47½ %
Tinned....dis 35 %
Tinned Broom, Nos. 20 21 22....dis 40 %
20c 21c 21c
Copper—Sheathing 14 @ 18 oz....₩ ℔ 29c
Planished....₩ ℔ 31c
" Boiler Sizes....₩ ℔ 29c
Bottoms....₩ ℔ 30c
Bolts....₩ ℔ 31 @ 32c
Braziers' Sheets....₩ ℔ 30 @ 32c
Sheet Iron.
18 Common....$3 05
24 Common....3 25
26 Common....3 45
24 W. D. Wood & Co., Smooth Finish....4 25
Planished....A. B.
11c 9¼c
Gen. Russia, No. 1 stained....12½c
" " clean....12c
Galvanized....dis 40 %
Tin Ware.
Deep Stamped Plain and Retinned....37½ %
Com. " " ....dis 25 %
Japanned " " ....dis 25 %

CHICAGO.

(The Chicago Stamping Co., 72, 74 & 76 Lake St.)
June 14, 1877.

Tin Plate.—

10x14, IC, Ch'l. Good.A		14x20, IXX, Ch' Best.	12 75
10x14, IC, " Best,	7 75	14x20, IXXX, " "	15 25
10x14 IX, " "	10 25	DC, 100 Plate " "	7 75
12x12, IC, " "	7 75	DX, " "	10 25
14x12, IX, " "	10 25	DXX, " "	12 75
14x20, IC, " "	7 75	DXXX " "	15 25
14x20, IX, " "	10 25	IC, Roofing, " "	7 25
20x28, IC, Charcoal Roofing, Good		IX, " "	9 75
20x28, IC, " Best			14 50
20x28, IX, " "			15 00
10x14, IC, Coke Plates			19 50
14x20, IC, "			6 75
10x20, IC, "			7 25

Block Tin.—
Large rigs....30c | Bars....23c
Small....31c
Zinc.—Sheet, 500 to 1000 ℔. Casks....7½c
Loose Sheets....8 c
Slab Zinc or Spelter....7 c
Copper.—Bottoms....32c
Sheathing....30c
Planished....37c
" Boiler lengths....29c
Bolt....35c
Braziers' Sheets.—
30x60, 6 to 7 lbs....₩ ℔ 6c | 30x60, 10 to 12 lbs....₩ ℔ 32c
30x60, 8 to 9 lbs.... " 34c | 30x60, 15 to 100 lbs.... c
Solder.—F. S. & Co.'s make
Best Fine....16c
No. 1....15c
Roofing....13c
Braziers or Sucker Solder....35c
Antimony....18c
Babbit Metal—F. S. & Co.'s....18c
No. 2....14c

Sheet Iron.—

	Common.	Smooth. Com.	Smooth Charcoal.	Smooth Juniata
No. 24.....	3 20c	4 1c	6 c	8 c
25 & 26...	3 40c	4 6c	6¼c	8¼c
27.....	3 60c	4 8c	6½c	8½c

Galvanized Iron.—
No. 16 to 20....12c | No. 27....15c
21 to 24....13c | 28....16c
25 & 26....14c
Russia Iron.—Perfect....14½c | No. 1 Stained....12½c In Sheets, 1c. higher.
American Russia.—A....11c | B....9½c In sheets, 1c higher.
Lead.—Pig....7 c | Lead Pipe, in full coils 8½
Bar....7½ | Lead Pipe, when cut.. 9
Sheet Lead.... 9
Wire—bright....dis 47½
Coppered....dis 40 %

PITTSBURGH.

The following are the Card rates, f. o. b. in Pittsburgh of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent.

Merchant Bar Iron....2c rates net
Flat Rail (1¼x¾), punched and coun'sunk..3¼c ₩ ℔ net
Iron Wedges....3½c ₩ ℔ net
Norway Nail Rods, Vasa....7 c ₩ ℔ net
Iron Crow Bars (in ordering please state whether "Wedge" or "Pinch" point)....4 c ₩ ℔ net
Beetle Rings....5½c ₩ ℔ net
Fence Pickets—
⅝ r'nd, bent to shape, 25c ₩ ft. of fence, less 15 % off net
Discount off Standard List.
Carriage and Tire Bolts, $500 worth purchased in six months, ending July and Jan. 1....75, 5&3 % off net
Stove Bolts....40 % off net
Elevator Bolts....30 % off net
Machine and Square Head Bolts....60 % off net
Coach and Lag Screws....60 % off net
Bolt Ends....60 % off net
Pat. Hot Pressed Sq. and Hex. Nuts....7½c ₩ ℔ off net
Washers, all made from new band iron....7½c ₩ ℔ off net
Nuts and Washers in 25 lb. boxes, ½c ₩ ℔ ex. Nuts and Washers in lots less than one keg each size, ¾c ₩ ℔ ex. Nuts and Washers in 5 lb. boxes, 1c. ₩ ℔ ex.
Standard Caps, for Plows....4½c. ₩ ℔ net
Iron Harrow Teeth, in lots of 1 ton or more, packed in 200 lb. boxes, 1 in. diam. 2½c ₩ ℔ net; ⅞ in. diam. 2¾c ₩ ℔ net; ¾ in. diam. 3c ₩ ℔ net.
Pat. Headed Harrow Teeth, packed in boxes, ½c ₩ ℔ ex.
Skein Bolts, in bulk, in lots of 1 keg or more, ⅞ in. diam. 4½c ₩ ℔ net; 9-16 in. diam. 5½c ₩ ℔ net; ½ in. diam. 6½c ₩ ℔ net. ½c ₩ ℔ extra when less than 1 keg of each size is ordered.
Screw Hook and-Eye Hinges, with Pat. Hooks, ¼ to 1 in. diam., 7c ₩ ℔ net; ⅝ in. diam., 8c ₩ ℔ net; ½ in. diam., 10c ₩ ℔ net.
Screw and Strap Hinges—all sizes under 28 in. long have Pat. Hooks 4 to 36 in. long, 3 4 10c ₩ ℔ net; 6, 8, 10 and 12 in. long, 4 9-10c ₩ ℔ net.
Strap & T Hinges....60&10 % off net
Hereafter we will not make any allowances for freight on Strap and T Hinges; our price on them is F. O. B. in Pittsburgh.
Screw Hitching Rings, light, with ¼ ring, No. 1, $4 00 ₩ 100 net; heavy with 5-16 ring, No. 2, $4 50 ₩ 100 net.
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long....₩ ℔ 3½c net
1 to 2 in. diam. from 4 to 8 ft. long.... " 3½c net
1 to 2 in. diam. from 1½ to 4 ft. long.... " 3½c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long.... " 4 c net
⅝, ¾ and ⅞ in. diam. from 1¼ to 4 ft. long " 4¼c net
Bridge bolts with upset ends....3c. ₩ ℔ extra
Wrought iron plates, punched....4½c. ₩ ℔ net
Cast Iron Washers....₩ ℔ 3½c net
Grass Rods....7½c ₩ ℔ net
Heel Bolts....8½c ₩ ℔ net
Duck Nest Tuyere Irons....$13 50 ₩ doz net
Wrought Iron Repair Links....15 % off net
" Rings....50 % off net
" Lap Rings....33⅓ % off net

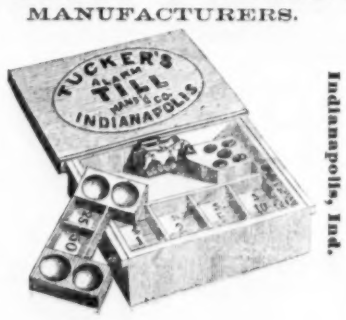
WAGON HARDWARE.

Single Trees, Neck Yokes and Double Trees, made from best selected Hickory, and ironed complete, in the most approved patterns.
No. 1 Southern Plow Single Tree, Ironed complete, Irons all Wrought....each, 38c net
No. 2 Western Plow Single Tree, Ironed complete, Irons all Wrought....each, 50c net
No. 3 Wagon Single Tree, Ironed complete, Irons all Wrought, except Malleable Ferrule....each, 60c net
No. 4 Wagon Single Tree, Ironed complete, Irons all Wrought; Improved End Pieces rivcted on; one side acts as a wear iron for wheel to rub against....each, 60c net
Neck Yoke, Ironed complete, Irons all Wt., except End Ferrules, with Wt. Iron Rings....each, 70c net
Southern Plow Double Tree, ironed complete, Irons all wrought....each, 60c net
Wagon Box Strap Bolts—For Orders of 50 Set, 45 % dis.

10 in. long by 7-16 at Screw End, ₩ set of 8 bolts..						45c
12	"	½	"	"	8	" .. 55c
12	"	9-16	"	"	8	" .. 65c
12	"	9-16	"	"	7	" .. 70c
14	"	9-16	"	"	8	" .. 80c
10	"	⅝	"	"	8	" .. 80c
12	"	⅝	"	"	8	" .. 90c
14	"	⅝	"	"	8	" .. 90c
16	"	⅝	"	"	8	" .. 1 00
18	"	⅝	"	"	8	" .. 1 10
20	"	⅝	"	"	8	" .. 1 20

5c ₩ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set....45c
" " " 3 " " " 50c
" " " 3¼ " " 55c
" " " 3½ " " 60c
Wrought Hammer Straps, heavy pattern, each....15 c
" " " light " each....12 c
" Rub Irons, each....9 c
Double and Single Tree Clips, figure 1, each....8 c
" " " " 2, each....9 c
" " " " 3, each....11 c
Pole Caps, each....20c
Strap Bolts, Bolster Plates, Hammer Straps, Rub Irons Clips and Pole Caps, in lots of 50 sets....dis 4% %
For each order amounting to $20 net, or over, for the following goods: Wagon Hardware, Carriage and Tire Bolts, Rivets, Skein Bolts, Nuts, Washers, Chains, Bevel Box and Tongue Cap Iron, we will allow an extra discount of 10 per cent. off all Wagon Hardware, subject to discount, comprised in the order. Jobbers who do not deal in iron, we allow to substitute Strap and T Hinges in lieu of Bevel Box and Tongue Cap Iron to make order up to $20 worth and secure the extra discount of 10 per cent.
Single Tree Hooks, Nos. 1 and 2....each, 3½c net
Single Tree Irons, New Pattern....each, 4¼c net
Stay Chain Hooks....each, 8¼c net
Wagon Box Rods, narrow track, with Pat. Collar....each, 7¼c net
Wagon Box Rods, wide track, with Patent Collar....each, 8¼c net
Wagon Brake Ratchets....each, 7 c net
" " " finished with guard..each, 20c net
Single Tree Iron, Wt. Hook, Malleable Ferrule....each, 7½ net
Single Tree Iron, Wt. ⅜ Hook and 7-16 Clip..each, 7c net
Single and Double Tree Iron, Wrought Center Clip, ⅝ in. Welded, with ⅝ in. Ring..each. 10c net
Southern Plow Center Clip, ⅜ in. Welded, and 7-16 End Clip with 5-16 in. Hook—per set of 3 pieces..23c net
Neck Yoke End Ferrule, Malleable, with Wt. Iron Ring....each, 6½c net
Neck Yoke Attachment, with plates complete....each, 23c net
Axle Tree Clips, No 1....each 2 ¼c net
" " No. 2....each 3¼c net
" " For Farm and Lumber Wagons, Shank, 9-16 in., flat part 1¼ in....each, 6¾c net
Plow and Wagon Clevises....₩ ℔ 7c net
California Tire Rivets and Burrs, 5-16....₩ 10c net
" " ⅜....₩ 11c net
Wagon Box Staples, 1¼ to 2¼ in. to clinch....₩ 1000 $10 75 net
" " " Bevel Box Iron, to rivet on, ₩ 1000 7 25 net
Neck Yoke Eyes, each....4¼c net
" " with ⅝ rings, each....7c net
King Bolts, ¾, 1, 1¼, and 1¼ in. diam....₩ ℔ 3½ net
Wagon Rivets, ex. large flat, oval and steeple head, ¼ in. diam., 1 in. and longer....₩ 7 c net
Wagon rivets, 5-16 in. diam., 1 in. and longer " 8 c net
" " ⅜ to 1 inch long....₩ ℔ 1c extra
" " & Nails, in 5 ℔ paper boxes....₩ 1c extra
" " " in 25 ℔ wood " ½c extra
Wagon and Hinge Nails, pointed by hand—
¼x⅝ and longer. 2¼ & 2½ 2 & 2¼ 1¾ and shorter.
11c ₩ ℔. 13c ₩ ℔. 15c ₩ ℔. 17c ₩ ℔ net
5-16x3 and longer. 2¼ & 2½ 2 & 2¼ 1¾ and shorter.
12c ₩ ℔. 14c ₩ ℔. 16c ₩ ℔. 18c ₩ ℔ net
Wagon Rivets and Nails, in less lots than one keg each size....₩ ℔ ½c extra
Double Tree Plates....7½c net
Coupling " ....4¾c net
Tongue " ....7½c net
Neck Yoke Plates....8¾c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₩ ℔ as No. 12 Band Iron.
Sand Band Iron, 1¼ in. wide, same price as No. 12 Band Iron.
Hub Band Iron, ¼c ₩ ℔ over price of same size Band Iron.
Wagon Chains, Stay, Lock and Tongue, 5-16 in., ₩ ℔ 7c net; ¼ in., 8c net.
Our prices are all subject to change of market, without notice.

TUCKER & DORSEY,
MANUFACTURERS.



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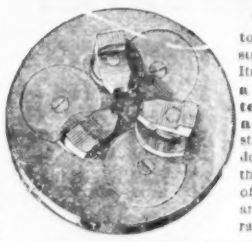
LATHE CHUCK.



We invite attention to the superior construction of this chuck. Its working parts are **absolutely protected from dirt and chips.** It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address,
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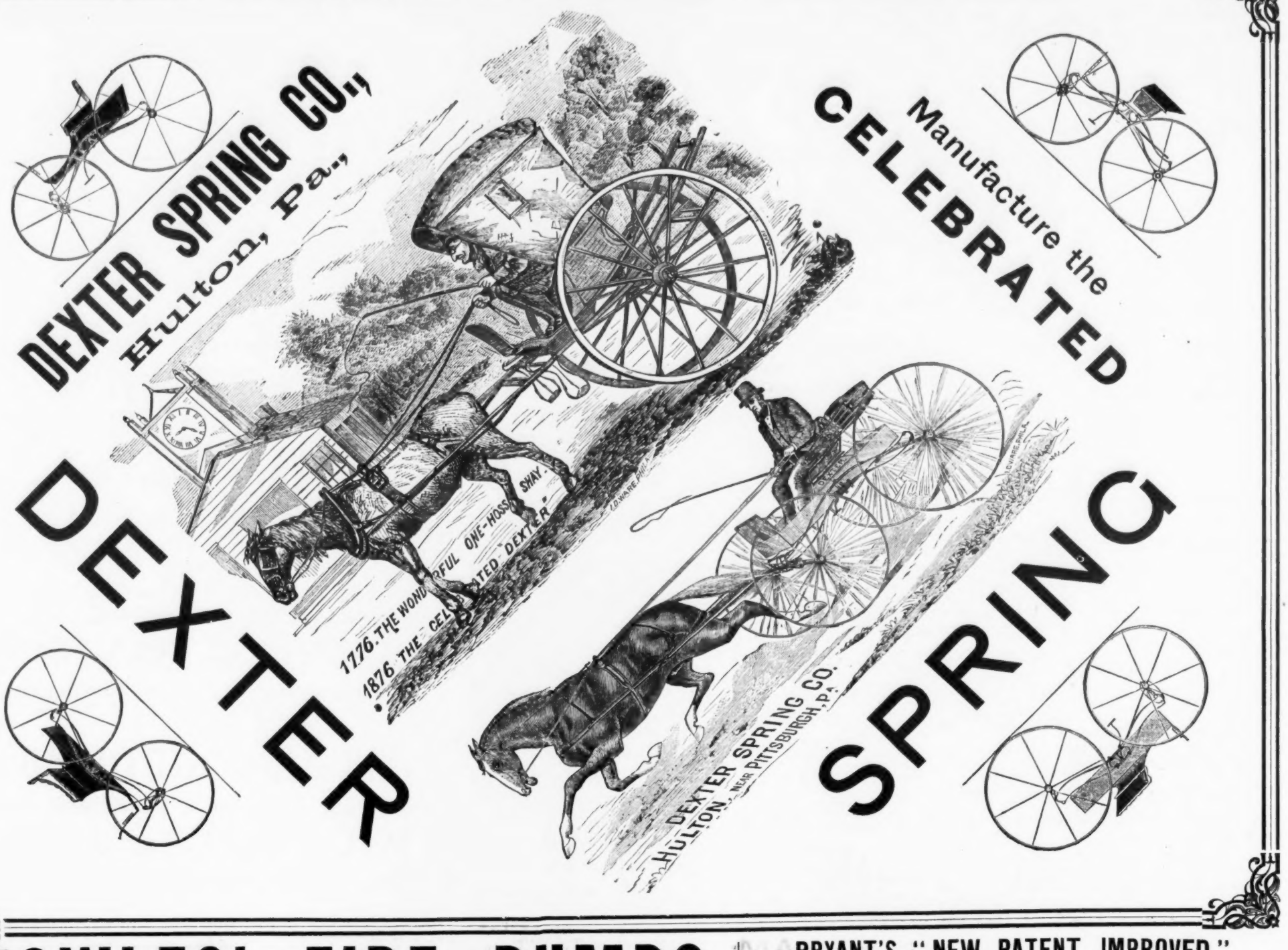
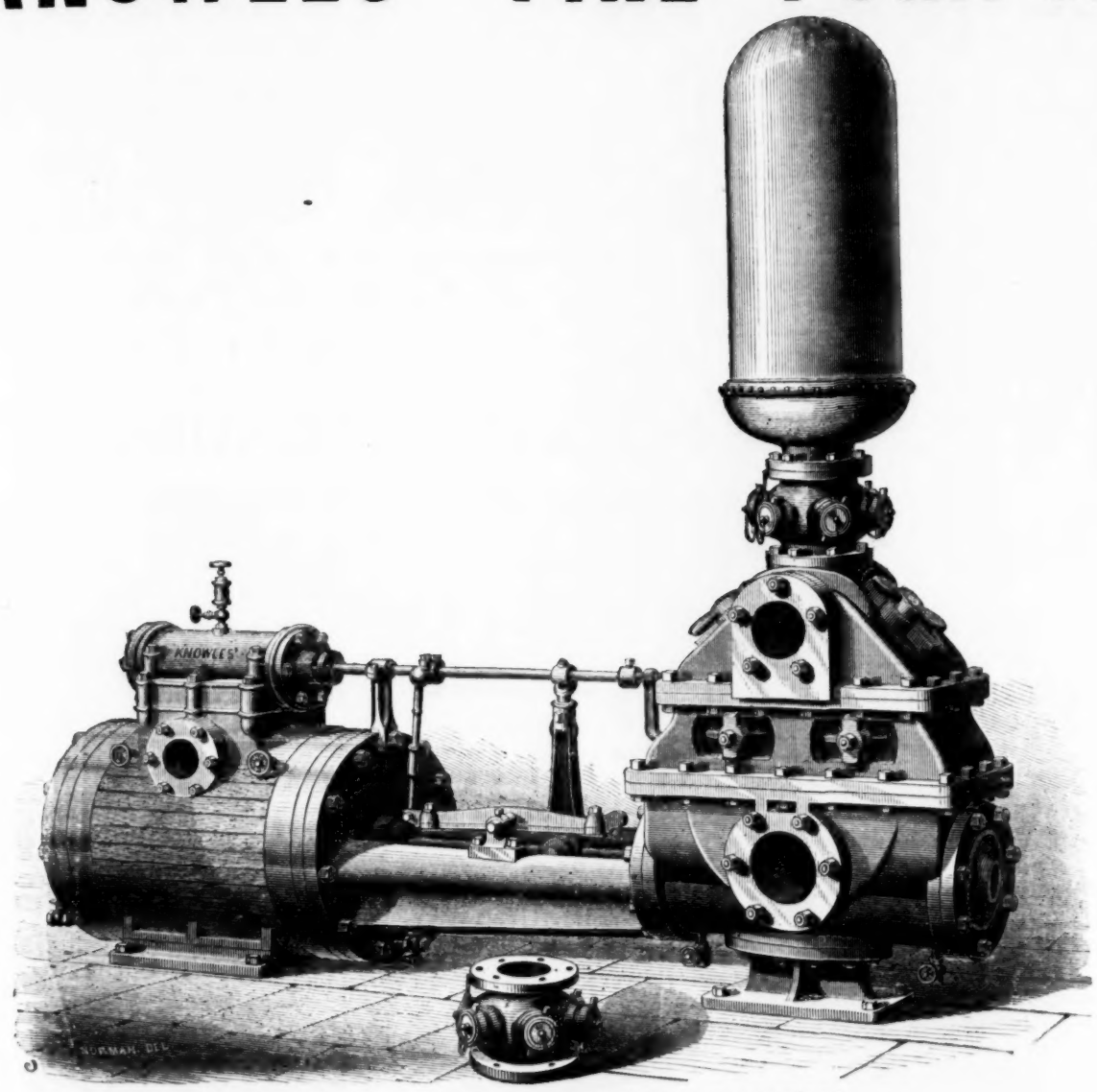


KNOWLES' FIRE PUMPS.



(12 inch Fire Pump, with 6-Way Hose Connection.)

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Self-Locking Stencil Letters and Figures.

Observe this patented

TRADE MARK.

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Assorted sizes for Straight, Circular and Hal Circle Printing. These letters **Change** to form any **Name, Word** or **Sentence, at pleasure.** Millions retailed yearly for Bag Plates, etc., marking Robes, Show-Cards, and a thousand daily uses.

Superior to All Other Stencils.

Also Inks, Brushes and all kinds of Stencils and Stock in large variety, at wholesale. These patent letters have been sustained by the U. S. Courts, in suit, O. G. Bryant vs. S. W. Reese & Co., before Judge Drummond, in Chicago, May 15, 1877. All genuine letters are stamped "Pat. March 3, '74," refuse all others and save suit and costs. These are *the standard goods*, having been four years on sale by me and dealers generally. All Hardware dealers should keep these goods.

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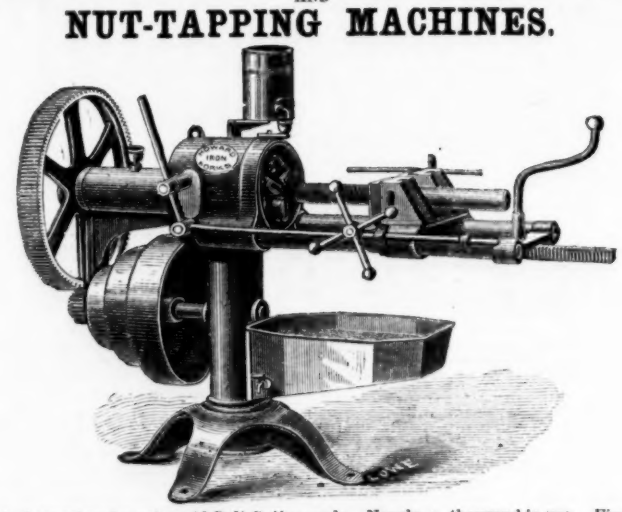

The *best, cheapest and most rapid Bolt Cutter* made. Nearly a thousand in use. *First Premium, Centennial Exhibition.* Six different sizes: smallest cuts threads on bolts, and taps nuts from one-fourth to one and one-fourth inches; the largest to three inches. Send for circulars giving full particulars and prices.

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Perfect Satisfaction.

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Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other
Two sizes: Large Size Boring, ⅞ to 3 inches; Small Size Boring, ½ to 1⅝ inches.

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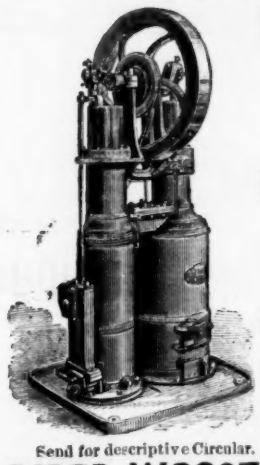

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Uses air as a Motive Power.

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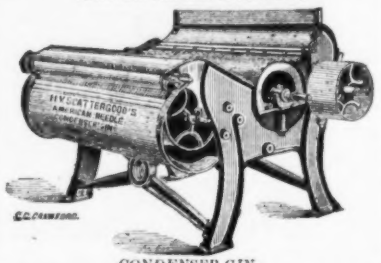

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Capacities from 1 to 100 tons.

This machine is used on a crane or any lifting apparatus, and indicates the weight on the dial directly the article is lifted. It is accurate, requires no adjusting, portable, and the greatest labor-saving weigher ever introduced.

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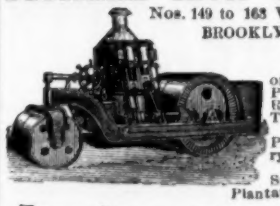

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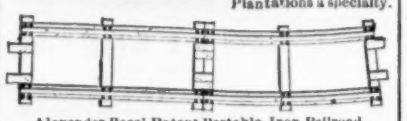

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Eddy Valves,

All Styles and Sizes.

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Anvils.—"Eagle American".....per lb. 9c; dis 20 %
Augers.—Watrous Ship.....dis 10 %
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Axes.—Blue Jacket.....$ 9 00
Racer.....8 00
Red Cross, Handled.....10 50
" " Boy's.....9 00
Blue Jacket " " 10 00
Axe Handles.—Wadleigh's Oak—
A (Extra) $2 50, B (No. 1) $2 00, C (No. 2) $1 50 ₱ doz
Blind Hinges.—Orr or Washburn's..₱ hun d sets $8
Blind Fasts.—
Orr or Washburn's.....per hundred set $6 00
Belts.—Carriage, Phila.....dis 60&20 %
Carriage, Common.....dis 75&10 %
Borax.—Best Refined.....₱ lb 11c
Borers.—Angle, Backus'.....dis 30 %
Boring Machines.—Angle.....each $4 50
Common, Snell's quality.....each 3 50
Braces.—Barber's.....dis 40&5 %
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Spofford's.....dis 50 %
Bracket
Saw Frames, with patterns complete.....₱ doz $6 00
Saws,....." 88
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Star Bronzed.....new list net
Star Japanned.....new list net
Store Shelf.....new list net
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Brushes.—Horse, Patent Metallic.....per doz. $4 50
Butts.—Union Drilled Loose Joint.....dis 55&10 %
" " Wire Fast Joint.....dis 40&10 %
" " Acorn Loose J't.....dis 55&10 %
Brass Butts.....dis 30 %
Wrought Table Butts and Back Flaps.....revised list, dis 35 %
Wrought Narrow Butts.....reduced, dis 40 %
Cards.—
Curry Cards, No. X, per doz., $0 55.....dis 30 %
Horse " No. X, " 0 90.....dis 30 %
Wool " No. 8X, " 2 60.....dis 15 %
Cotton " No. 10, " 3 50.....dis 10 %
Cartridges.—U. S. Cartridge Co.....dis 60 %
Chisels.—"Buck Bros." Shank Goods.....dis 20 %
Socket.....dis 25 %
Compasses and Dividers.—Bemis'.....dis 40 %
P. S. & W.....dis 30 %
Cordage.—Manila (usual trade dis.).....₱ lb 14c
Corn Hooks......per doz $2 75
Crow Bars.—Soft Steel.....₱ lb. 9c
Cow Ties......dis 30 %
Dividers.—Cook's Nickel Plated.....dis 15 %
Door Springs.—Mosely—

Per doz.	$9 00	12 00	15 00	18 00	24 00
No.	0	1	2	3	4

Torrey's.....$2 50
Gem.....dis 10 %
Drills.—Whitney's with Chucks.....$12 50
Emery.—Alden.....₱ lb 7c
Wellington Mills.....₱ lb 10c
Files.—American.....dis 30 %
Nicholson, new list.....dis 30 %
Wheeler, Madden & Clemson.....½ to 1"; 10 %
Stubb's Tapers, genuine, 3 in., $1 50; 3½, $1 62; 4, $1 88; 4½, $2 13; 5, $2 50
Hammers.—Maydole—new reduced list.....dis 15 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1¼, $8 75.....dis 25 %
M., B. & D., solid cast steel, belt face, No. 1 $11; 1¼, $9 75.....
Hammond—new reduced list.....dis 15 %
Hangers & Rollers.—Anti-Friction.....dis 40 %
Climax.....dis 40 %
Acme Rollers.....dis 40 %
Baskets.—Underhill Edge Tool Co.....dis 25 %
C. F. Dowse, warranted Cast Steel—
Shingling.....0, $4 75; 1, $5 25; 2, $5 75
Claw.....1, 5 75; 2, 6 25
Lathing.....1, 5 50
Axe Pattern.....1, $7 00; 2, 7 50
Broad.....0, $5 75; 1, $6 50; 2, $7 50; 3, $9 25; 4, $10 75; 5, $12 75; 6 $14 75
Hinges.—Strap and T Stanley Works.....dis 60 %
Plate, Loose and Fast Joint.....₱ lb 5c
Wrought Screw Hook.....₱ lb 5c
Knobs.—Imp. Extension Silvered Glass.....₱ doz $8 00
Lanterns.—Tubular No. 0.....$10 00
Guarded. No. 74, (with kerosene oil and candle burners).....5 50
Lead.—Sheet, 9c.; Pipe, 8½c.....dis 10 %
Locks.—Norwalk Lock Co.....dis 50 %
Mattocks.—
K. P. & Co., axe finish, long cutter.....$11 50—net
Short cutter.....11 00—net
Meat Cutters.—"Miles's" Challenge.....dis 30 %
No. 1, $22 00; 2, $30 00; 3, $40 00.
Metal.—Babbitt.....No. 1, 35c; 3, 25c; 5, 15c ₱ lb
Nails.—10d and larger.....$2 50
Nail Pullers.—Little Giant—Small.....per doz., $2 00
Little Giant—Large....." 30 00
Padlocks.—Wilcox.....dis 33⅓&5 %
Picks.—R. P. & Co., Solid Eyes.....5 to 6 6 to 7
$9 00 $9 50
Pins.—Universal Hatand Coat all Wood—
2 in.....₱ gross $2 50; 3 in., 3 50; 4 in., 4 50—dis 15 %
Planes.—Auburn Tool Co.....dis 40 %
N. Y. Tool Co.....dis 50 %
Plated Ware.—Rogers bros.....dis 40 %
Pocket Knives.—Conn. Cutlery Co.....new net list
American Shear Co.....new net list
Plumb & Levels.—Stanley.....dis 60&10 %
Pulleys.—Axle.
Fr'me pol. wh't pt. face, No. 15, 1 ¼ in., 20c.; 16, 2 in., 26c.
Pol. wh't br'zed face No. 115, 1 ¼ in., 20c; 116, 2 in., 26c.
Pulley Blocks.—"Best Boston Make".....net
Rail Barn Door.—For Novelty and Anti-Friction Hangers.....per foot 7c., dis 40 %
Refrigerators.—Heinz Patent.....dis 20 %
Rivets.—Black.....dis 40 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8.....dis 30 %
13 13 14 14 15 16c ₱ lb
Sad Irons.—Bliss & Drake.....₱ lb 3½c
Sand Paper.....dis 15 & 5 %
M. B. & D.....0 to 2, $4 25; 2 to 3, $4 75
Saws.—*Hand and Panel*—
X Cut, Wheeler, Madden & Clemson.....per ft., 35c
" Champion....." 45c
" Lightning....." 45c
" Great American....." 50c
Wood Saws, Welsh & Griffith.....₱ doz $12 00
Wheeler, Madden & Clemson's, same list as "Disston's".....dis. 20 %
Disston's.....dis. 20 %
Saw Horses.—Extra.....₱ doz $2 25
Folding....." 3 00
Screws.—Am. Screw Co., new list Sept. 1st.....dis 60&10 %
Aiken's.....dis 60&10 %
Scythe Stones.—
"Willoughby Lake," first quality.....₱ gross $6 50
" " second quality....." 3 00
Shovels.—O. Ames.....dis 30 %
M. B. & D.....dis 30 %
Spading Forks.—W. C. & Co.....dis 40 %
Tools.—Aiken's Pattern.....₱ doz $5 00
Aiken's Genuine, $12.....dis 40 %
" Saw Sets, $13.....dis 40 %
Traps.—Oneida.....dis 25 %
Blake's.....dis 40 %
Vises.—R. P. & Co.'s Solid Box. Blacksmith.....₱ lb 12c
Parker's Parallel.....dis 10 %
Backus.....dis 25 %
"Howards." Parallel.....dis 25 %
Wardrobe Hooks.—Wire to drive.....₱ gross $1 00
Weights.—Window Weights.....₱ lb 12½
Wedges.—Axe.....₱ doz 50
Wire.—
Eureka in spools, No. 28 to 40 assorted...₱ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green, 4½c
Drab or Black.....₱ ft 4½c
Wrenches.—Genuine Wrenches, G. A. Coes, dis 40 & 10%
Wringers.—Universal XX No. 2.....₱ doz $66 00
Novelty, No. 10....." 63 00
" No. 2....." 66 00
" No. 22....." 50 00
Excelsior A, with bench....." 84 00
" E, set tubs....." 72 00
Eureka....." 57 00
Welcome....." 60 00
Wittnington, Cooley & Co.—Hoes, Rakes, Forks &c. dis 40 %. Special rate for Export.

ST. LOUIS.

Corrected weekly by Semple & Birge Mfg. Co.

Animal Pokes......$7 50 ₱ doz. net
Apple Parers.—Conqueror.....₱ doz $7 75
Hudson's Rotary....." 7 75
Axes.—Wm. Mann's, Red Warrior.....₱ doz 9 75
"C. Marshall"....." 9 25
Handled....." $5 extra
Double Bitted....." 19 50
Hunt's....." 12 00
Axles.—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent Swelled Taper, Plain Taper and Concord Axles.....dis 30 %
Common Axles (Pat. Lubricating), 1½ inch and upward.....₱ lb. 6c
do. less than 1½ inch....." 6½c
Babbitt Metal.—

Nos.	4	3	2	1	A 1	Genuine.
	9½	11	16½	20	31	34c ₱ lb.

Bellows.—Best St. Louis make, new list.....dis. 12½ %
Belts.—Troy, Church, School and Farm Belts..₱ in. 50c
"Improved Amalgam Bronzed" 15 in., $7 00; 17 in., $7 50; 19 in., $8; 21 in., $8; 24 in., $14; 27 in. $19 50
Belting.—"Boston Belting Co.'s" Rubber.....dis 50&10 %
Bradford & Sharp's" Oak-Tanned Leather.....dis 35 %
Boilers.—Farmer's Profit Feed Boilers.....dis 20 %
" Caldrons.....dis 25 %
" Sugar Kettles.....dis 30 %
Bolting Cloth.—New gold list.....net
Bolts.—Arms. Bell & Co.'s Carriage & Tire.....dis 70 & 10%
Butts.—Western Butt Co.'s new list—
Narrow Fast Joint.....dis 25, 12½&10 %
Broad Fast Joint.....dis 35, 12½&10 %
" Loose " .....dis 45, 12½&10 %
Reversible.....dis 40, 12½&10 %
" Japanned and Silver Tipped..dis 50, 12½&10 %
Loose Joint " Acorn " " .....dis 45, 12½&10 %
Churns.—Julien, No. 2, $7 00; No. 3, $7 50; No. 4, $8 50.....dis 25 %
Cider Mills.
Buckeye Senior $27 00; Buckeye Junior, 18 00.....net
Corn Knives.—Dunn Edge Tool Co.'s Chp...₱ doz 4 50
Seymour Mfg. Co.'s Solid Steel Back....." 4 50
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers.....dis 10 %
Hand Shellers.....Special rates
Cotton Gins.—Carver, with 10 in. Saws, $2 25 a Saw, net
12 in. Saws, $4 00 a Saw.....25%

Crow Bars.—Steel Pointed.....₱ lb 6c
Drag Saw Machines.
Culver's Iron Drag Saw.....dis 15 %
Excelsior Drag Saw with Log Trucks.....dis 12½ %
Fanning Mills.—Nash & Cutts.....dis 25 %
Feed Cutters.—Burdick National.....new list, net
Sanford No. 1, $10 00; No. 2, $8 00.....net
Bowman's Lever Cutter, $8 50.....net
Files.—Black Diamond, Mill.....$5 00 & currency
" Bastard.....5 00 & currency
" Taper.....5 00 & currency
Forges and Blowers.
Keystone Portable Forge Co.'s.....dis 10
Forks and Hoes.
Auburn Mfg. Co.'s Hay and Manure Forks.....dis 35 %
" Handled Hoes.....dis 35 %
Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe.....dis 20 %
" Planet Drill, Nos. 2 and 3.....dis 25 %
" Combined Drill and Wheel Hoe.....dis 20 %
Grinding Mills.—Challenge Feed Mills.....dis 15 %
Sedgebeer's Nonpareil Mills.....dis 15 %
Bradford's French Burr Mills.....dis 5 %
Hammers.—Masons' Hammers.....₱ lb 18c
Smiths' Hand....." 18c
Handles.—No. 1 Fork, Hoe and Rake.....dis 25 %
No. 2 Fork, Hoe and Rake.....dis 30 %
Ax, Pick, Sledge and Small Handles.....new list
Hay and Cotton Presses.
Dederick's Railroad.....dis 10
" Perpetual.....dis 10%
Hay Knives.
Dunn Edge Tool Co.'s.....₱ doz $12 00 net
Lightning (Weymouth's Patent).....₱ doz $30 00
Horse Nails.—National Patent Pointed.....20c rate
National Patent Pointed, extra finished.....22c "
Horse Pitchforks.—Pitts or Carey's Patent.....dis 10 %
Wheeler's Railway.....dis 10 %
Sandwich Lever.....dis 10 %
Hose.—
Boston Belting Co.'s Rubber Medium Sizes, dis 30&10 %
" " " S. Siz. Hydrant..dis 30 %
Mattocks and Grub Hoes.
Klein, Logan & Co.'s Mattocks...₱ doz $11 25 @ 11 60
" Grub Hoes, oval eye " 8 30 @ 9 25
Money Drawers.—
Pierpont & Co.'s Excelsior.....per doz $38 00 net
Nails.—Wheeling Riverside Brand.....$2 50 rates
Packing.—Boston Belting Co.'s Rubber, Plain..dis 30 %
Boston Belting Co.'s Rubber, Pure.....dis 25&5 %
" " No. 1 Plain.....dis 40 %
" Round and Square.....dis 10&10 %
Picks.—Railroad and Clay.....₱ doz $8 00 @ 9 75 net
Coal....." 6 50 @ 7 20 net
Pen....." 9 45 @ 18 15 net
Stone....." 11 00 @ 11 60 net
Tamping....." 11 75 @ 12 25 net
Miners Drifting....." 7 80 @ 10 60 net
Plows.—Avery's Cast and Steel.....dis 30 %
Avery Sulky Plow.....dis 20&5 %
Collins Cast Cast Steel.....new list net
Pekin Steel.....dis 25 %
Plow Sulky.—Buckeye.....$27 00 net
Post Hole Augers.—Clark's Patent—
No. 1, ₱ doz. $27; No. 2, $30; No. 3, $32.....dis 25 %
Pulleys.—5 inch.....per doz $3 70 net
4 inch.....per doz 2 50 net
Pumps.—St. Louis, Farm, Patent Metal Lined..dis 30 %
Rakes.—Advance Paddock Sulky.....each $24 00 net
St. Louis Revolving 14 tooth.....4 45 net
" 16 " .....4 65 net
" Hand Hay Rake.....per doz $2 50
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives.....dis. 40 %
" " Sections.....dis 45 %
Road Scrapers.—Steel.....each $4 50 net
Cast Iron.....dis 10&5 %
Saws.—Curtis & Co.....dis 15 %
Scythes.—Dunn Edge Tool Co.'s.....dis 50 %
Scythe Stones.—No. 1 Indian Pond ₱ gr's, $7 00
Extra Indian Pond, " 4 50 } $11 25
Premium " 10 50
Diamond Grit " 13 00
Shovels and Spades.—Groom Shovel Co...dis 40%
Grain Scoops—Patent Co.'s Straps Groom Shovel Co.....dis 40 %, and 50c per doz. extra
do. M. Rowland & Co., dis 30 % and 50c " "
do. O. Ames & Son, 1st 25% & and 50c " "
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished.....₱ lb 14c net
Solid Cast Steel....." 10c net
Spaths and Cradles.—Seymour Mfg. Co.'s..dis 30 %
Sorghum Machinery.—Bell Cane Mills.....dis 30 %
Scantlin's Seamless Pans and Evaporators.....dis 20 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express.....₱ lb 14½
Blue Seat Springs.....₱ pair, $1 00
Thimble Skeins.—Whitewater's.....dis 40&10 %
Vises.—Wilson Mfg. Co.'s.....₱ lb. 14½c
Wheelbarrows.—Champion Iron Wheel..₱ doz. $ 9 50
Champion Wood Wheel.....₱ doz 2 50
" Garden.....₱ doz. 59 00
Wagons.—Whitewater Farm Wagons—
Thimble Skein—
2¾ in. $66; 3 in. $67 50; 3¼ in. $70; 3½ in. $71
Wire Rake Ties.—Buckeye Double Twist.....net list
Dederick Adjustable.....new list, dis 25 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. S. Hew & Co.)

Tin Plate.

IC, 10x14, Best Char.	$ 7 50	DX, 13½x17, B. Cha.	$10 00
IX, 10x14, "	10 00	DXX, 12½x17 "	12 50
IC, 12x12, "	7 50	DXXX, 12½x17 "	15 00
IX, 12x12, "	10 00	IC, 20x28, "	17 50
IC, 14x20, "	7 50	IX, 20x28, "	22 00
IX, 14x20, "	10 00	IXX, 20x28, "	28 00
IXX, 14x20, "	12 50	IC, 14x20, Best Roof.	6 75
IXXX, 14x20, B. Char.	15 00	IX, 14x20, "	9 25
IXXXX, 14x20, "	17 50	IC, 20x28, "	14 00
IC, 12x24, "	8 00	IX, 20x28, "	18 00
IX, 14x14, "	18 00	IC, 10x14, Best Coke	6 50
IXX, 14x14, "	21 00	IC 14x20, "	6 50
DC, 12½x17, "	7 50	IC, 10x20, "	10 50

Sheet Iron.

	Com'n.	S L U Sm'th.	D. Ref'd Sm'th	Jumi'a Sm'th
No. 16 to 20	3 3c	4 3c	5½c	7 9c
No. 22 to 24	3 40c	4 2c	5½c	7 9c
No. 26	3 40c	4 4c	6c	8 10
No. 27	3 60c	4 6c	6½c	8 30

Genuine Russia Iron.

Perfect—No. 9, 10, 11, 12.....per lb. 13½c
No. 1 Stained—No. 9, 10, 11, 12.....per lb. 12½c
Tare 22 lbs. to Bdle. For less than Bdle. add 1c. ₱ lb.
Patent Planished Iron.
No. 24 to 27, A quality.....per lb. 11c
" " B " ....." 9½c
For less than Bdle. add 1c. per lb.
Galvanized Sheet Iron.
Juntata, or 1st quality.....dis 40 %
Block Tin.
Banca, Large Pigs.....32c | do. Small.....31c
Straits, Large Pigs.....30c | Bar.....33c
Eng. Ref'd, Large Pig.....32c |
Solder.
Extra in Bars.....14c | No. 2, in Bars.....12c
No. 1, in " .....13c | Spelter Solder.....36c
Pig Lead—Pigs.....7c | in Bars.....8c
Antimony.....15c
Bismuth.....$2 15
Nickel.....3 00
Crucibles.—Dixon's.....₱ No. 5c
Babbit Metal.
No. 1.....₱ lb. 18c | No. 3.....₱ lb 13c
" 2....." 16c | " 4....." 8½c
Copper.
Brader's, 30x60, 14 to 100 lbs. Sheets.....32c
" " 10, 11 & 12 lbs., " 32c
" " 8 and 9 lbs. " 34c
" " 6 and 7 lbs. " 36c
Tinned, 14x48, 14 and 16 oz.....26c
Planished, 14x48, 14 and 16 oz.....28c
" Boiler Sizes 14 and 16 oz.....4 c
Gutter Copper, 20 and 24x72, 10, 11 and 12 ₱ lb., Sheets.....29c
" 14 ₱ lb. Sheets.....30c
Reservoir Copper, 16x60 and 18x60.....33c
Bar Copper, Square and Round, ⅜ to 1⅝ inch.....31c
" " " ⅜ inch.....34c
Copper Bottoms.....30c
Soldering Coppers.....30c
Brass.
Roll, No. 10 to 28, 12 in. in width.....30c
" 30, 12 in. in width.....31c
" 32, 16 " 33c
" 30, 16 .....37c
" 26, 16 .....35c
Platers, No. 40, 6 .....38c
Brass and Copper Wire.

	Brass.	Copper.		Brass.	Copper.
No. 0 to 20	34c	45c	No. 24	39c	50c
" 21	37c	46c	" 25	42c	53c
" 22	39c	47c	" 26	44c	54c
" 23	37c	48c	" 27	46c	56c

Brass Spring Wire, 2c. ₱ lb advance.
Brass Tubing.
Plain to No. 20.....45c | 5-16 inch.....50c
¾ inch.....50c | ½ " 33c
Copper Rivets and Burs.....dis 10 %
Brass Kettles.....₱ lb 45c
Sheet Zinc.—500 lbs. cask.....7c
250 lbs. cask.....7¼c
Sheet.....new " 7½c
Wire.—Iron, Bright Market.....new, dis 52½ %
Iron, Coppered Market....." dis 47½ %
Fence, Nos. 7, 8 and 9....." ₱ lb 4½c
Trellis, Nos. 10 and 11....." 5c
" No. 12....." 5 2c
Hay Baling, Charcoal, No. 9 and 11....." 5¼c
" " No. 12....." 5¾c
Broom, Tinned, Nos. 18 to 22....." 10c
Fence Staples.....per keg of 100 lbs. $6 00
Per lb.....5½c
Iron Rivets.—Black, papered.....new dis %
Tinned, papered....." dis %
In bulk.....new 3-16 ¼ 5-16 ⅜ in. diam.
" " 11¼c 10½c 10 c 9½c per lb.
Sad Irons.....₱ lb 3½c
Enameled Kettles.—Standard Mfg. Co.....dis %
Enameled Sauce Pans.
Standard Mfg. Co.....dis %
Enameled Boilers.—Standard Mfg. Co.....dis %
Dripping Pans.—Smooth Iron.....₱ lb
Geneva Fluters.....per doz $15 00
Mouron Fluters....." 14 50
Stove Polish.—Dixon's.....per gross 6 00
Gem.....4 50
Jamaicene.....3 50
Dixon's, in bulk.....₱ lb 10c
Coffee Mills.—Parker's.....dis 30 %
Granite Iron Ware.....dis 35 %
Spoons.—New list.....dis 10 &
Retinned Iron Ware.....45 % off
Plain Stamped Ware.....35 % off
Japanned Ware.—St. Louis list.....dis 40&5 %
Fry Pans.....dis 50 %
Ears.....dis 50 %

THE JUDSON GOVERNOR.

It is a common method to advertise Governors *without cost,* unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

Reduced Price List,

FEBRUARY 1, 1877.

☞ For dimensions of Governor, see Illustrated Price List.

THE JUDSON PATENT

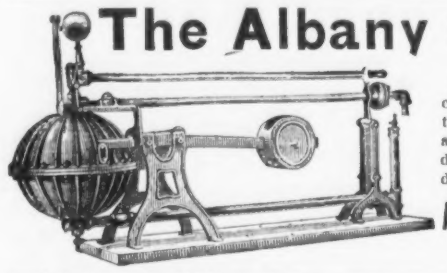
Improved Steam Governor.

Size, Inch.	Plain.	Bright Finished.	Extra for Sp'd'r	Stop Valve.
½	$16 00	$18 00	$1 90	..
¾	18 00	20 00	1 90	..
1	20 00	22 00	2 00	$5 00
1¼	23 00	26 00	2 25	6 00
1½	26 00	30 00	2 50	8 00
2	31 00	35 00	2 75	10 00
2¼	36 00	41 00	3 25	12 00
2½	40 00	45 00	3 50	14 00
2¾	45 00	51 00	3 75	16 00
3	50 00	57 00	4 25	19 00
3½	59 00	67 00	4 50	23 00
4	69 00	78 00	5 00	28 00
4½	80 00	90 00	5 50	34 00
5	90 00	101 00	6 00	40 00
5½	105 00	117 00	6 50	46 00
6	120 00	133 00	7 00	54 00
7	142 00	156 00	8 00	65 00
8	175 00	192 00	9 00	79 00
9	198 00	218 00	10 00	..
10	210 00	240 00	12 00	..

No Charge for Boxing & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

The Albany Steam Trap.



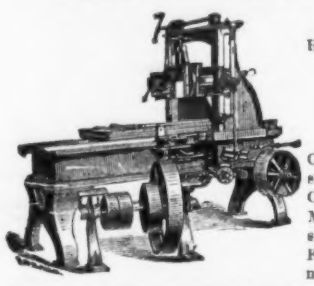
This Trap automatically drains the water of condensation from *Heating Coils,* and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,
Albany, N. Y.

The Pratt & Whitney Co.,

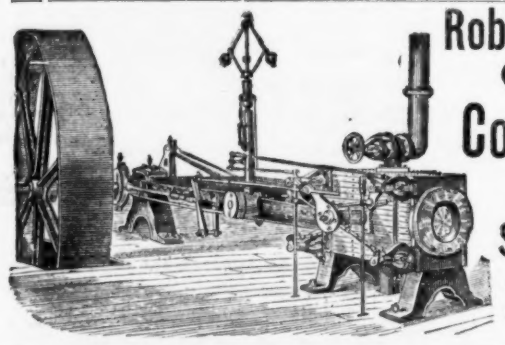
Hartford, Conn.,

Have constantly on hand and making



Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



Robt. Wetherill & Co

CHESTER, PA.

Corliss Engine

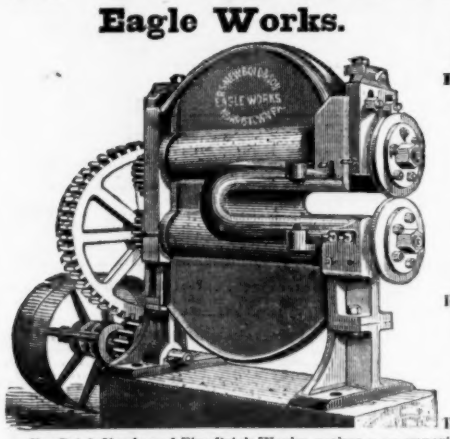
BUILDERS,

Shafting & Gearing,

Boiler Makers.

R. S. NEWBOLD & SON,

Eagle Works. Norristown, Pa.



IMPROVED ROTARY SHEARS,

Rolling Mill, Blast Furnace, Flour Mill, Mining and Water Works Machinery. Air Compressors, Ore Washers and Brick Machines.

REFERENCES:

Rotary Shears for Plates and Circles.
A. Wood & Co., Conshohocken, Pa.
Ernst Stridsberg, Sweden.
Lewis Dalzell & Co., Pittsburgh, Pa.
H. A. Beale & Co., Parkesburg, Pa.

Rolling Mill & Blast Furnace Plants & Engines.
Merion Furnaces, Conshohocken, Pa.
Aurora Furnace, Wrightsville, Pa.
Clovespring Iron Works, New York.
Norristown Water Co.
Oliver & Co., Easton Sheet Mill.
Pottstown Iron Co.'s Plate Mill.
Parkesburg Flue Mill.
Morris, Tasker & Co., Engines.

Durand & Marals' French Pat. Brick,

For Brick Yards and Fire Brick Works, makes 10,000 superior bricks per day with two horse-power. In use at Brookville Brick Yards, Lynchburg, Va.; F. W. Kickbusch, Wausau, Wis.; Cheltenham Fire Brick Works, St. Louis, Mo. Can hack bricks 12 high at once. The best, simplest and cheapest machine made.

THORNE, DeHAVEN & CO., Drilling Machines,

21st Street, above Market, Philadelphia.

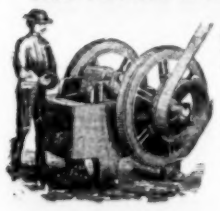
PORTABLE DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
VERTICAL DRILLS. Self-feeding.
MULTIPLE DRILLS. 2 to 20 Spindles.
HORIZONTAL BORING AND DRILLING MACHINES.
HAND DRILLS. CAR BOX DRILLS.
SPECIAL DRILLS. For Special Work.

H. H. HARVEY'S HAMMER AND TOOL WORKS,
Augusta, Me.

SPECIALTIES.—Stone Cutters' Hammers and Tools, Quarrymen's Drills, Wedges and Half Rounds, &c., &c., &c., Miners' Hammers and Tools, Blacksmiths' Hammers and Tools, Patent Hammers for picking burr stone. Also the common Mill Picks and Wood wedges Steel or Iron, R. R. Solid eye Picks, with one lb. of best Cast Steel inserted in each pick. The above goods are warranted inferior to none, both in quality and style of finish. All hammers have true eyes and polished faces, and are made from solid cast steel. No charge is made for boxing or carting at Augusta; shipping facilities are excellent. Hammers made to any pattern or drawing. Capacity of works, one ton of hammers per day. A full line of the above goods constantly in stock. Catalogue on application.

BLAKE'S PATENT
STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



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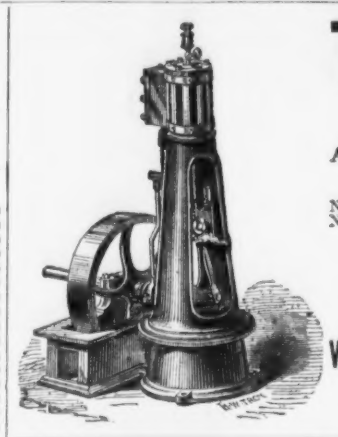

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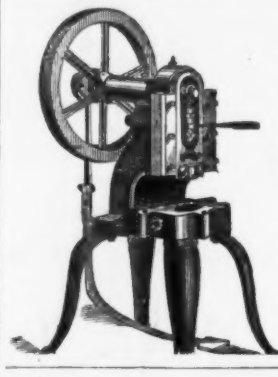

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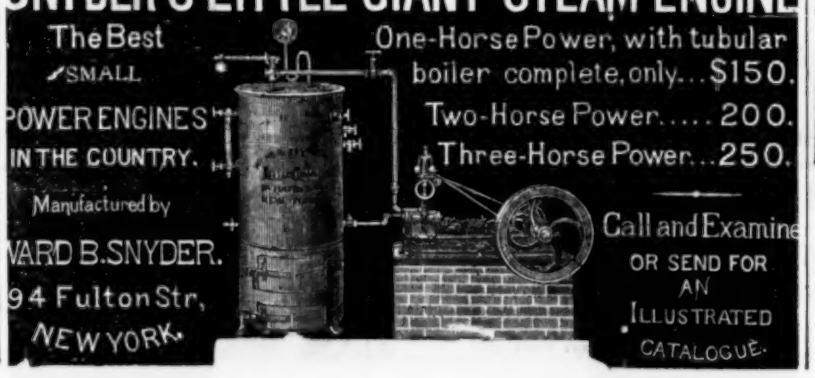

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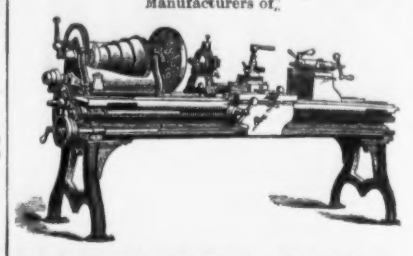

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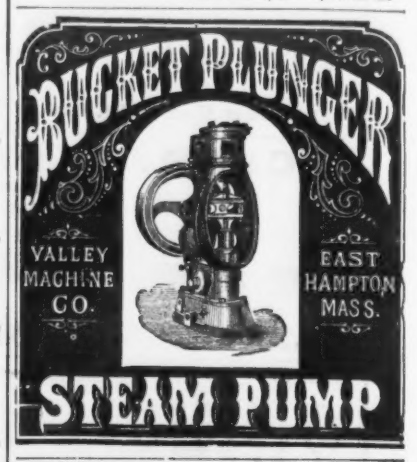

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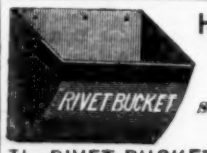

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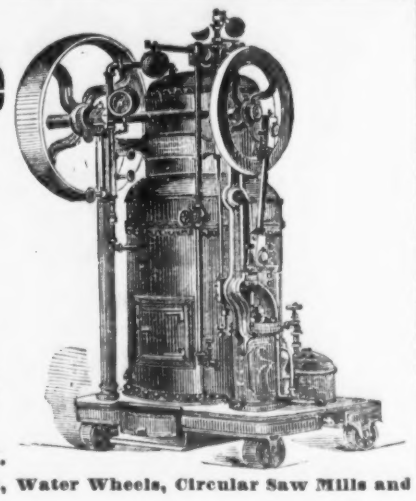

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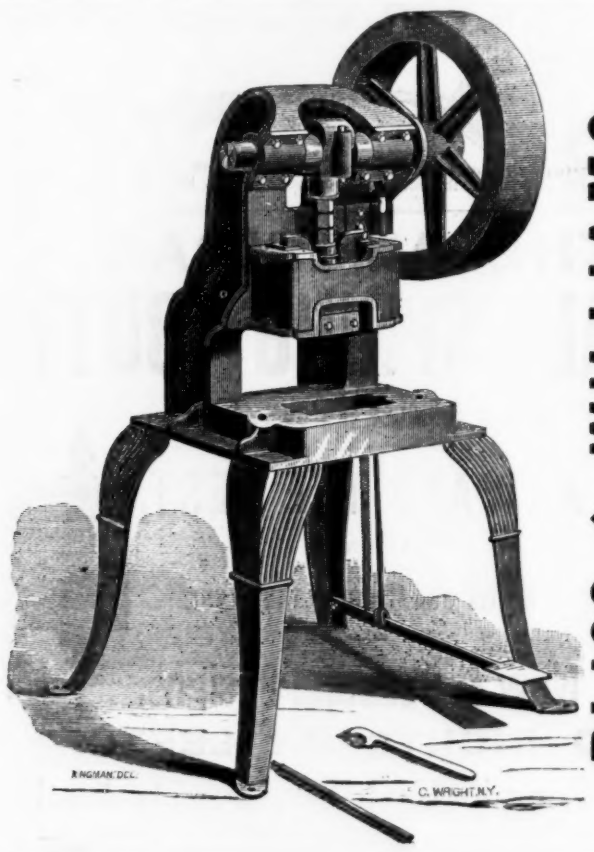

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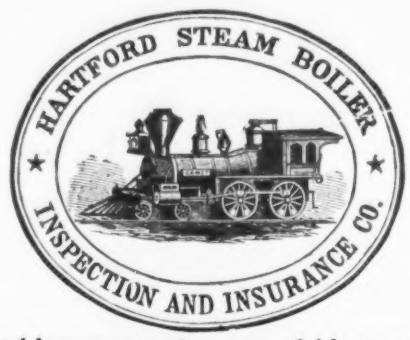

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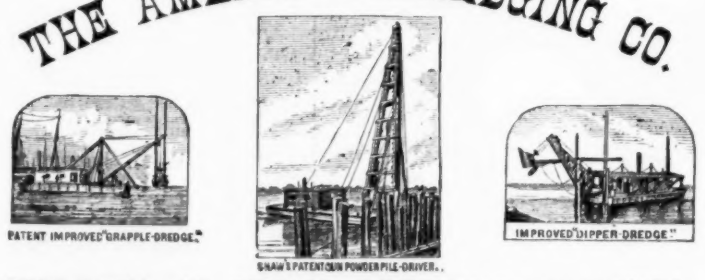

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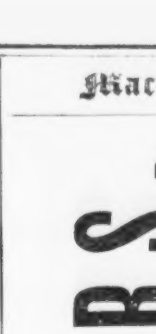

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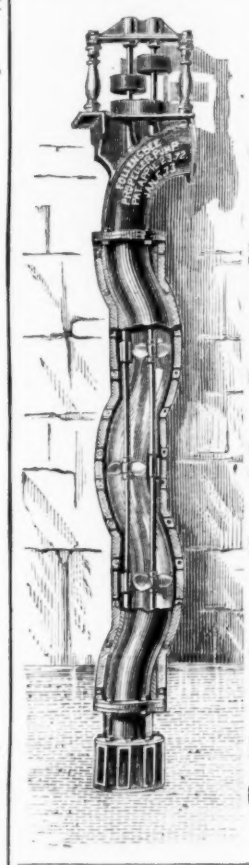

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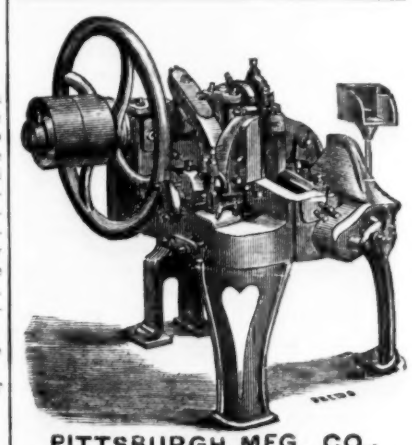

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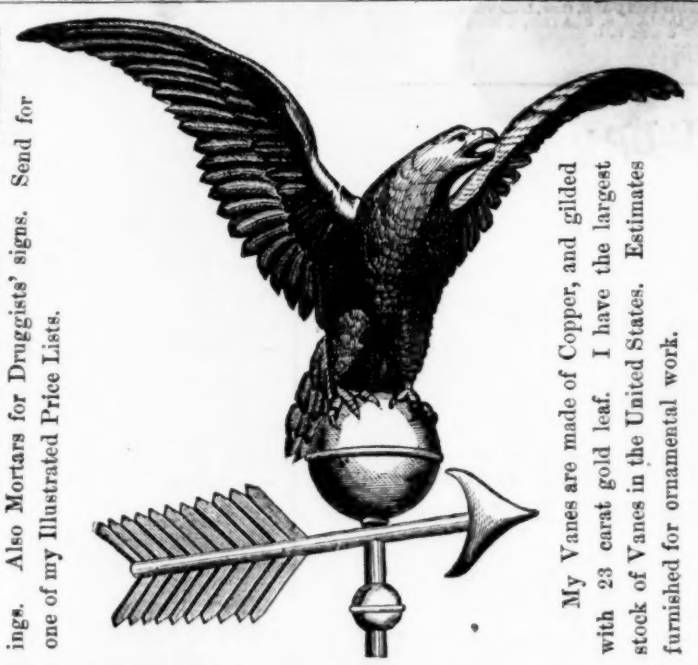

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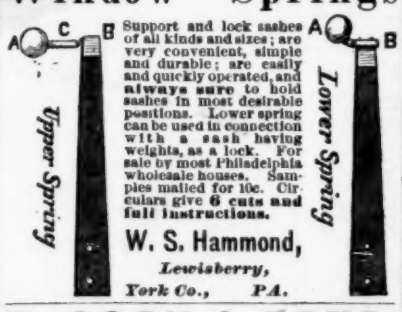

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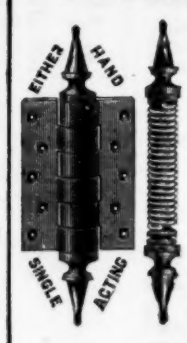

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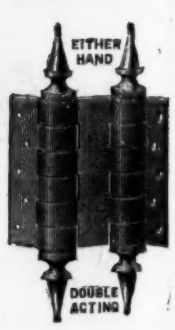

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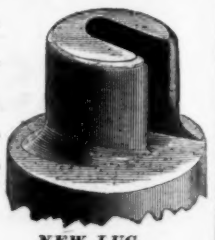

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